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REPORT

OF THE

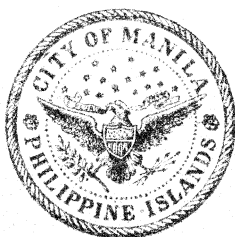
MUNICIPAL BOARD

OF THE

CITY OF MANILA

FOR THE

FISCAL YEAR ENDED JUNE 30, 1904.



24305

MANILA:
BUREAU OF PUBLIC PRINTING.
1905.

REPORT
OF THE
MUNICIPAL BOARD
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FOR THE
FISCAL YEAR ENDED JUNE 30, 1904.

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Florida Manuscript Board.

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REPORT OF THE MUNICIPAL BOARD OF THE CITY OF MANILA FOR THE FISCAL YEAR ENDED JUNE 30, 1904.

MUNICIPAL BOARD OF MANILA,
Manila, P. I., October 1, 1904.

SIR: In compliance with the provisions of the Charter of the city of Manila the Municipal Board hereby submits the third annual report of the operations of the government of the city for the fiscal year ended June 30, 1904.

In submitting this report general remarks regarding the work of the various departments are presented by the Board, which are followed by the detailed reports from the department chiefs.

The personnel of the Board was increased under the provisions of Act No. 936 of October 9, 1903, amending the Charter of Manila and providing that the City Engineer and the president of the Advisory Board shall be ex officio members of the Municipal Board. Under the provisions of this law the Hon. Miguel Velasco, as president of the Advisory Board, became a member of the Municipal Board October 15, 1903, and Maj. J. F. Case, City Engineer, on October 17, 1903. This increase to the number of the members of the Municipal Board has been very satisfactory, bringing the Board in closer touch with the views of the Advisory Board and providing an engineer as a member of the Board. This act also makes it almost always possible to obtain a quorum at any time without the necessity of the appointment of temporary members of the Municipal Board, as provided for by law.

Mr. P. G. McDonnell has been absent on leave since February 23, 1904, and Maj. J. F. Case since June 16, 1904, and no temporary appointment has been made necessary by their absence, a quorum always having been available by the recognizing of the Acting City Engineer, Mr. S. B. Patterson, as an ex officio member of the Board in the absence of the City Engineer.

ADVISORY BOARD.

The personnel of the Advisory Board has remained unchanged since the last report. In all 70 items of municipal business were referred to the Advisory Board for consideration, and 101 items, relating mainly to complaints from the Filipino population and recommendations for

the betterment of the service, were brought to the attention of the Municipal Board through the Advisory Board.

Member Infante, representing the District of Ermita, coöperated with the Municipal Board as a member of the committee appointed by the Board for the purpose of initiating the work of widening Calle Nueva, Ermita.

Meetings have been held once a week according to the practice which was established in January, 1903, and business has been handled with much less delay than previously.

The Board is pleased to acknowledge the usual coöperation and to note the continuation of the zeal manifested in behalf of the welfare of the various districts represented. As a rule the action of the Advisory Board, or its individual members, has lead to a clearer conception of the work of the various departments and a broader knowledge among the Filipino people of the progress of city government, and the result has been beneficial to all those concerned.

The members of the Advisory Board are: Señor Miguel Velasco, president, San Miguel; Señor Basilio Regalado Mapa, Intramuros; Señor Juan Tuason, Quiapo; Señor José Paterno, Santa Cruz; Señor Tomas Arguelles, Sampaloc; Señor Teodoro R. Yango, Binondo; Señor Rogaciano Rodriguez, San Nicolas; Señor Crispulo Feliciano, Tondo; Señor Antonio Ma. Pabalan, Paco; Señor Vicente N. Somoza, Malate; Señor José R. Infante, Ermita; Señor Segundo Rodil, Santa Ana; Señor Francisco Rosario, Pandacan; Señor Vicente Rodriguez, secretary.

OFFICE OF THE SECRETARY OF THE MUNICIPAL BOARD.

In addition to the routine work of this office the Secretary has been given additional responsibility in providing for the entrance of the indigent sick to the San Juan de Dios Hospital for treatment. A contract was entered into with this institution on the 15th day of August, 1903, providing for a regular schedule of reimbursement by the city for each patient treated belonging to the above-mentioned class. The total number of patients admitted is 978, at a cost to the city of ₱39,961. Seven hundred and thirty-three were cured and discharged, 143 died, and 102 are carried as under treatment on June 30, 1904.

The records of the city have been carefully and satisfactorily kept, and the work of the Board, and indirectly of all city departments, has been expedited and improved. At the same time, as will be seen by reference to the detailed report of the Secretary, while the amount and importance of the work handled by the office has been increased the expenses have been reduced.

DISBURSING OFFICER.

The work of the Disbursing officer of the Municipal Board, Mr. R. C. Baldwin, has been greatly increased during the year, owing to the

large amount of work that has been undertaken and the larger number of employees made necessary thereby. He has paid on an average 4,850 employees each month during the year, having disbursed during the year ₱5,292,272.42. In virtue of the increased work and responsibilities placed upon this officer it has been deemed advisable by the Board to recommend an increase in salary from ₱5,000 per year to ₱6,000 per year. Attention is invited to detailed report of the Disbursing Officer.

COMMITTEE ASSIGNMENTS.

The work of the Board has been divided among the following committees, having the membership indicated below:

Name.	Chairman.	Member.	Member.
Law	Herrera		
Education	do	Sleeper	Velasco.
Health and sanitation	do	Velasco	McDonnell.
Finance and taxation	Sleeper	do	Do.
Fire	do	Herrera	Velasco.
Licenses	do		
Police	McDonnell	Herrera	Do.
Engineering and public works	do	Case	Do.
Parks and cemeteries	do	do	Do.
Streets, bridges, and wharves	do	do	Sleeper.
Waterways and ferries	Velasco	do	McDonnell.
Sewers	McDonnell	do	Herrera.
Water system	Velasco	McDonnell	Case.
Weights and measures	do		
Transportation	McDonnell		
Electric installation and illumination	Sleeper	Velasco	Do.
Markets and matadero	Velasco	Sleeper	Herrera.
Advisory Board	do		

REPORT ON FINANCE.

The financial condition of the city of Manila at the close of the fiscal year shows a material change in that during the past year the maximum revenues were collected which were followed by the maximum expenditures that may be expected for some years unless the city secures a loan for public improvements which will be absolutely necessary in the near future if public improvements are to be made to any extent. The statement at the close of the fiscal year 1904 shows a credit balance of ₱610,497.45, with practically no liabilities.

The following statement shows the receipts for the fiscal year, the expenditures by departments, and the financial condition on June 30, 1904. However, there may be some slight modifications in the figures presented inasmuch as the accounts have not yet been audited and these figures were taken from the report of the collecting and disbursing officers:

Receipts of the city of Manila for fiscal year 1904.

Assessor and Collector:

Land tax	₱1,713,214.98
Industrial tax	609,479.75
Stamp sales	166,067.95

Receipts of the city of Manila for fiscal year 1904—Continued.

Assessor and Collector—Continued.

Certificates of registration	P 91, 426. 37
Matadero fees	175, 645. 34
Market fees	285, 875. 47
Licenses	357, 366. 89
Live-stock registration	1, 108. 77
Vehicle tax	51, 549. 11
Vehicle equipment	2, 526. 83
Municipal Court fines	151, 971. 31
Justice-of-peace fees	4, 825. 60
Sheriff's fees	11, 489. 99
Rents	15, 817. 37
Miscellaneous	5, 303. 65
Certificates of electrical installation	3, 955. 60
Pound receipts	4, 357. 74
Registration of cocheros	376. 85
Public-health fees	15, 619. 67
Secretary Municipal Board fees	67. 50
City Attorney	34. 22
Sales of land	5, 460. 39
City Assessor and Collector from June 1 to June 30, 1904; City Engineer from July 1, 1903, to May 31, 1904:	
Weights and measures—	
Assessor and Collector	185. 24
City Engineer	6, 485. 70
Pail system—	
Assessor and Collector	1, 790. 04
City Engineer	7, 418. 74
Building permits—	
Assessor and Collector	1, 311. 59
City Engineer	13, 590. 70
Cleaning vaults—	
Assessor and Collector	159. 29
City Engineer	591. 06
Boiler inspection—	
Assessor and Collector	456. 00
City Engineer	600. 00
City Engineer:	
Water service—	
Rates	162, 892. 57
Plumbing	7, 785. 60
Fines	765. 99
Fire plugs	1, 823. 77
Auctions and miscellaneous	2, 597. 37
City Attorney:	
Register of Deeds, fees	16, 209. 11
Secretary Municipal Board:	
Sale of Spanish-Filipino bonds and supplies	6, 929. 30
Total	3, 905, 133. 42

Statement of expenditures, city of Manila, during the fiscal year 1904.

FISCAL YEAR 1904.

Department.	Salaries and wages.	Contingent expenses.	Public works.	Equip-ment.	Tax re-funds.	Total.
Municipal Board	P96,341.93	P126,997.03				P223,338.96
Law Department	130,833.94	15,718.76				146,552.70
Fire Department	180,322.34	31,885.10		P86,618.67		298,826.11
Assessments and Col-lections	148,116.65	16,123.39			P4,522.80	168,762.84
City Schools	273,952.15	5,477.66				279,429.81
Police Department	1,099,206.14	48,077.87		61,557.74		1,208,841.75
Engineering and Public Works	912,580.12	102,404.45	P1,465,431.93			2,480,416.50
Public Works			378,562.65			378,562.65
Total	2,841,353.27	346,684.26	1,843,994.58	148,176.41	4,522.80	5,184,731.32

FISCAL YEAR 1903.

Municipal Board	P140.00	P27,440.74	P42,549.06			P70,129.80
Law Department	148.32	6.40				154.72
Fire Department		19.70				19.70
Assessments and Col-lections	475.52					475.52
Police Department	275.00	2,088.38				2,363.38
Engineering and Public Works	51.34	4,141.02	30,705.62			34,897.98
Total	1,090.18	33,696.24	73,254.68			108,041.10
Grand total						5,292,772.42

Statement of condition of city's finances June 30, 1904.

Balance from fiscal year 1903	P410,304.72
Total revenues collected fiscal year 1904	3,905,133.42
Thirty per cent of expenses paid by Insular Government	1,587,831.73
Total credits	5,903,269.87
Total expenditures during fiscal year 1904	5,292,772.42
Balance to credit of city June 30, 1904	610,497.45

The revenues for the year (P3,905,133.42) show an increase of P844,023.86, or 27½ per cent, over those of last year, the increase being due primarily to the collections of the land tax during the fiscal year for eighteen months, the increased revenue on account of the change from local to Philippine currency, which became effective on the 1st day of January, 1904, and also a natural increase due to increased business in many items.

The principal sources of revenue of the city contributed in about the following ratios:

Miscellaneous revenues.

	Per cent.
Land tax	43.9
Stamp sales	4.3
Industrial tax	15.6
Certificates of registration	2.3
Matadero fees	4.5
Market fees	7.3
Licenses	9.2

Miscellaneous revenues—Continued.

	Per cent.
Vehicle tax	1.3
Municipal Court fines	3.9
Rents .....	.4
Cemetery fees .....	.4
Water service	4.4
Register of Deeds .....	.4
All other items	2.1
Total	100

The total expenditures during the year (P5,292,772.42) exceeded those of the previous year by about 35 per cent. Of these expenditures, P108,041.10 is applicable to the fiscal year 1903, leaving the actual expenditures for the fiscal year 1904 P5,184,731.32, which may be segregated as current and nonrecurrent expenses as follows:

Current and nonrecurrent expenses, fiscal year 1904.

CURRENT EXPENSES.

Department.	Salaries and wages.	Contingent expenses.	Public works.	Equipment and apparatus.	Tax refunds.	Total.
Municipal Board	P88,015.93	P123,455.97				P211,471.90
Law Department	130,833.94	15,718.76				146,552.70
Fire Department	180,322.34	31,885.10		P13,140.38		225,347.82
Police Department	1,099,206.14	{ 1,363.22 46,714.65 }		4,575.27		1,151,859.28
Assessments and Col- lections	148,116.65	16,123.39			P4,522.80	168,762.84
City Schools	273,952.15	5,477.66				279,429.81
Engineering and Pub- lic Works	903,480.12	102,404.45	P849,290.80			1,852,175.37
Total	2,820,927.27	343,143.20	849,290.80	17,715.65	4,522.80	4,035,599.72

NONRECURRENT EXPENSES.

Municipal Board	P8,326.00	P3,541.06				P11,867.06
Fire Department				P73,478.29		73,478.29
Police Department				56,982.47		56,982.47
Engineering and Pub- lic Works	12,100.00		{ P378,562.65 616,141.13 }			1,006,803.78
Total	20,426.00	3,541.06	994,703.78	130,460.76		1,149,131.60

SUMMARY.

Salaries and wages	P2,841,353.27
Contingent expenses	346,684.26
Public works	1,843,994.58
Equipment and apparatus	148,176.41
Tax refunds	4,522.80
Total	5,184,731.32

The foregoing statement shows that the current expenses the past year were P4,035,599.72, of which P2,820,927.20, or about 70 per cent, was expended for salaries and wages, while the ratio for the previous year was 76 per cent; P343,143.20, or about 8½ per cent, was expended for contingent expenses, while for the previous year about 8 per cent was expended for contingent expenses; P849,290.80, or about 21 per cent, was expended for public works and maintenance thereof, while for

the year previous only 16 per cent was expended for the same purpose; ₱22,238.45, or one-half of 1 per cent, was expended for equipment and apparatus during the present year.

The relation of salaries and wages, which consumed 70 per cent to the total current expenses of the city, may be stated as follows:

Number of Americans and Filipinos employed in the different departments.

Department.	Relation of salaries and wages to total current expenses.	Average number of Filipinos employed.	Average number of Americans employed.	Total.
	<i>Per cent.</i>			
Municipal Board ¹	2.2	23	13	36
Law Department.....	3.3	50	22	72
Fire Department.....	4.5	76	75	151
Assessments and Collections.....	3.7	130	28	158
City Schools.....	6.8	283	² 189	472
Police Department.....	27.2	488	390	878
Engineering and Public Works.....	22.3	33,307	109	3,416
Total.....	70	4,357	826	5,183

¹ Includes Advisory Board, Secretary's Office, and Disbursing Officer.

² Includes night school teachers.

³ Includes day laborers.

Included in the items for contingent expenses, equipment and apparatus, and public works, there are various amounts, the aggregate of which is ₱1,272,321.82, which appear as payment to the Insular Purchasing Agent for property purchased of that Bureau by the city government. Of this amount ₱127,232.18 is the increased cost to the city for the services rendered by the Insular Purchasing Agent, and it is desired again to invite attention to the fact that the percentage on purchases by the city of the Insular Purchasing Agent should be materially reduced or the city allowed its own purchasing agent, as it is believed that with the amount of money paid the Insular Purchasing Agent during the year better results could be obtained than have been obtained through the Insular Purchasing Agent. Although the services of the Insular Purchasing Agent have somewhat improved during the year, they can not be said to be satisfactory in all respects to the city. In other words, the city is contributing a larger amount to the support of the Insular Purchasing Agent than is reasonable, and the recommendations made in the last annual report—that a reduction be made to somewhere near the actual cost to the Insular Purchasing Agent for making purchases for the city—are repeated.

Nonrecurrent expenses of the city for the year 1904.

Municipal Board:

Salaries and wages, Board of Tax Revision.....	₱8,326.00
Incidental expenses, Board of Tax Revision.....	2,029.26
Settlement of claim, Salvador Farre.....	1,511.80

Fire Department:

Apparatus and equipment	73,478.29
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Nonrecurrent expenses of the city for the year 1904—Continued.

Police Department:	
Police-alarm equipment	P36, 274. 37
Revolvers	20, 708. 10
Engineering and Public Works:	
Salary of Consulting Engineer	12, 100. 00
Construction of rock-carrying scows	19, 061. 25
Construction of river wall at Arroceros shops	3, 596. 01
Paving blocks for Rosario and Escolta	24, 145. 72
Purchase of pails and covers for pail system	39, 479. 00
Water pipe and fittings for extension of system	85, 120. 00
Scales and track for matadero	1, 319. 21
Purchase and installation of new sewer pipe	12, 346. 09
Purchase and installation of fire hydrants	22, 462. 83
Expenses borne by Insular Government in support of pail system subsequent to January 1, 1904, charged against appropriation for city of Manila	23, 946. 92
Purchase of pail system from Board of Health	384, 664. 10
Public Works, city of Manila:	
Construction of machinery building, Arroceros	10, 534. 00
Construction of steam road roller shelter	1, 878. 00
Construction of fire station, Tanduay	54, 761. 30
Construction of Tondo police station, partial pay- ment	9, 450. 00
Construction of veterinary hospital, Palomar Island	10, 829. 83
Purchase, ground site for La Loma Cemetery	40, 000. 00
Improvement of new cemetery	9, 986. 60
Purchase of property for street purposes and the ex- tension of—	
Calle Victoria	15, 000. 00
Calle Palacio	4, 442. 95
Calle Sacristia	18, 586. 48
Calle Bilibid and Limasana	571. 32
Extension and widening of streets in Ermita	15, 243. 31
Extension and improvement of new water system	50, 000. 00
Completion of H Street, Ermita	11, 309. 09
Grading and improving Calle Moriones, Tondo	11, 936. 33
Purchase of paving blocks for Calle Echague	2, 612. 82
Improvement of street in San Lazaro estate	7, 836. 00
Completion of San Marcelino	9, 627. 44
Construction of new city hall	93, 957. 18
Total	1, 149, 131. 60

FISCAL YEAR 1905.

The outlook for revenue for the city of Manila for 1905 is far less encouraging than it was at the beginning of the previous fiscal year, on account of the fact that some of the larger sources of revenue which the city depended upon will be eliminated by the effect of the new internal-revenue law, which becomes effective in relation to these items January 1, 1905, thus effecting the city of Manila for half of the coming fiscal year.

This law abolishes the industrial tax entirely and reduces the income from said tax for the present year by ₱350,000. The sale of revenue stamps, which in the present year yielded an income of ₱166,000 to the city, will hereafter yield its income for Insular purposes and reduce the revenues of the city of Manila for the coming year by approximately ₱86,000.

Various changes have been made in the provisions of the Charter of Manila, revoking the right of the city to license many industries. Fees for licenses on places of amusement, pawnbrokers, etc., have materially decreased, and the estimated loss to the city of Manila for the present year will be about ₱20,000. However, to partially offset these losses the city has been given a certain share of the internal-revenue tax, apportioned according to its population, which it is estimated will increase the revenues ₱90,000 for the year, thus leaving a net estimated loss to the city through the internal-revenue law of ₱366,000. In addition to this loss the estimated revenues from the land tax will be ₱300,000 less than last year, due to the fact that during the present fiscal year collections covering eighteen months were made. To offset this loss it is expected that many items of revenue will be materially increased, such as market collections, vehicle taxes, fees for justices of the peace, sheriff's fees, fees for electrical installation, rents, sale of lots in the cemeteries, fees for pail system, cleaning vaults, and water rents, and it is also expected that some revenue will be derived from the tax on the gross income of the street railway company.

Altogether it is estimated that the revenues will be decreased about ₱500,000 from the year previous, and they are estimated as follows:

Estimates of revenues for fiscal year 1905.

Land tax	₱1, 400, 000
Industrial tax	280, 000
Stamp sales	80, 000
Certificates of registration	90, 000
Matadero receipts	175, 000
Market receipts	300, 000
Licenses	350, 000
Live-stock registration	1, 000
Vehicle tax	55, 000
Vehicle equipment	2, 000
Municipal Court fines	160, 000
Justice-of-peace fees	5, 000
Sheriff's fees	10, 000
Rents	16, 000
Miscellaneous collections	5, 000
Electrical inspection	4, 000
Pound receipts	4, 000
Cemeteries and health fees	25, 000
Fees:	
Secretary Municipal Board	100
City Attorney	200

Estimates of revenues for fiscal year 1905—Continued.

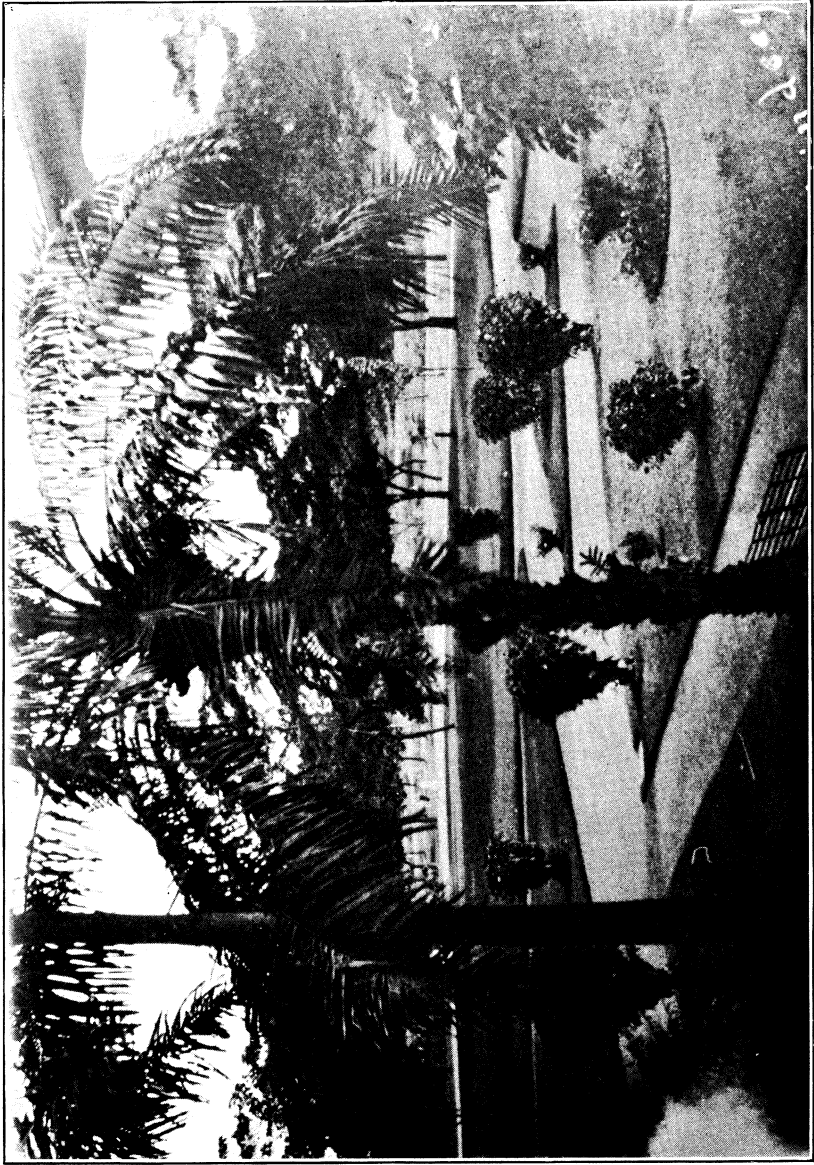
Sales, city land	P5,000
Weights and measures	7,000
Pail system, cleaning vaults	45,000
Water rates	185,000
Building permits	18,000
Boiler inspection	1,200
Street railroad	6,000
Internal-revenue taxes	90,000
Register of Deeds	20,000
Total	3,339,500

ESTIMATED EXPENDITURES, FISCAL YEAR 1905.

In order that the expenditure of the city's funds might be kept well within the receipts a proportionate reduction has been made in the amount expected to be expended, and appropriations have been made accordingly. In this connection it is desirable to state that in making this reduction of expenses items for permanent public improvements have been necessarily reduced, and if the revenues of the city are to be maintained on a basis of the fiscal year 1905, and if public improvements are to be made in the city of Manila, funds therefor should be obtained, and a loan for ₱4,000,000 for permanent public improvements is strongly urged by the Board. These improvements will be along the lines of widening and extension of the present street system, the erection of public buildings for school, fire, and police purposes, the betterment of the esteros, and the beginning of a park system. This, in addition to the ₱8,000,000 already authorized for water and sewer improvements, would put the city in a fair way to become a modern city. The taxpayer would be far better satisfied to know that he would only have to bear his proportion of the expense of public improvements than it should all be charged to him and his successor reap the benefits. A city with a population and assets of the city of Manila could well afford a bonded debt of ₱12,000,000 with an assessed valuation for real estate alone of ₱75,000,000, if compared with many of the progressive modern cities of the United States. The estimated expenditures for the fiscal year 1905 are as follows (showing a comparison with expenditures for the last fiscal year in the item of ordinary expense):

Estimate of ordinary expenses for fiscal year 1905, with statement of same for 1904.

Department.	1905 (estimated).	1904.
Municipal Board:		
Salaries and wages	P95,000.00	P88,015.93
Contingent expenses	133,000.00	123,455.97
Law Department:		
Salaries and wages	135,500.00	130,833.94
Contingent expenses	13,500.00	15,718.76
Fire Department:		
Salaries and wages	230,000.00	180,322.34
Contingent expenses	40,000.00	31,885.10
Equipment and apparatus	4,000.00	13,140.38



BOTANICAL GARDENS.

Estimate of ordinary expenses for fiscal year 1905, etc.—Continued.

Department.	1905 (estimated).	1904.
Police Department:		
Salaries and wages	P1,150,000.00	P1,099,206.14
Contingent expenses	51,000.00	46,714.65
Equipment and apparatus	2,000.00	4,575.27
Secret Service fund	2,000.00	1,363.22
Assessments and Collections:		
Salaries and wages	154,000.00	148,116.65
Contingent expenses	17,000.00	16,123.39
Tax refund	3,000.00	4,522.80
Schools:		
Salaries and wages	300,000.00	273,952.15
Contingent expenses	4,200.00	5,477.66
Department of Engineering and Public Works:		
Salaries and wages	900,000.00	900,480.12
Public works (maintenance)		849,290.80
Contingent expenses	699,300.00	102,404.45
Total	3,933,500.00	4,035,599.72

Estimate of extraordinary expenses for fiscal year 1905.

Department and item.	Amount.	Department and item.	Amount.
Municipal Board:		Public Works—Continued.	
Apparatus and equipment, furniture and fixtures	P2,500	Carromata shed, rear city hall	P6,400
Engineering and Public Works:		Pandacan Market	6,000
Salaries and wages, new water and sewerage systems	30,000	Paving blocks, Escolta and Rosario	7,000
Apparatus and equipment	54,300	Continuation of widening Nueva	50,000
Assessments and Collections:		Widening streets in general	50,000
Apparatus and equipment	1,500	Site for police station, Solis	1,000
Police Department:		Construction of 4 new bridges	80,000
Apparatus and equipment	22,000	Ferry at Pandacan	4,000
Fire Department:		Gagalangin market	4,000
Apparatus and equipment	64,000	Vaults, city hall, and Assessor and Collector	10,000
School Department:		Foundation and erection of Bionondo Bridge	8,000
Apparatus and equipment	3,200	Improvement of Streets Concepcion and San Carlos	25,000
Law Department:		Construction of new streets	20,000
Apparatus and equipment	6,000	Cement curbing, 25,000 feet	20,000
Public Works:		Paving Escolta and Rosario	26,000
New water mains, installation	7,000	Stone monuments, street intersections	2,000
Water pipes, fittings, and hydrants	100,000	2 fire extinguishers, city hall	1,600
Sack carriers, street cleaning	2,485	Completion retaining wall, Arroceros shops	5,000
Seats, pail system	10,000	Street signs, 3,000	2,750
Benches for park	3,000		
100 dump carts	13,000		
3 sprinkling wagons	3,300		
100 mules	44,000		
Gates No. 6 stone crusher	9,200		
		Total	704,235

Recapitulation.

Item.	Ordinary.	Extraordinary.	Total.
Salaries and wages	P2,964,500	P30,000	P2,994,500
Contingent expenses	258,700		258,700
Public works	699,300	520,735	1,220,035
Tax refunds	3,000		3,000
Apparatus and equipment	6,000	153,500	159,500
Secret Service fund	2,000		2,000
Total	3,933,500	704,235	4,637,735
Funds appropriated for public works, fiscal year 1904, to be expended in 1905			502,554
Allowance for deficiencies and emergencies			59,711
Grand total			5,200,000

In spite of the reduced revenues from the city and the needs for large expenditures the Board has considered it advisable to reduce the

expenditures in such a manner as to leave an available balance after the close of the fiscal year. Considering the expected revenues and expenditures the following prospective condition of the city's finances at the close of the fiscal year 1905 is submitted:

Statement of prospective condition of city's finances at close of fiscal year 1905.

Balance June 30, 1904	P610, 497. 45
Estimated revenues	3, 339, 500. 00
Thirty per cent of expenses to be paid by Insular Government	1, 560, 000. 00
Total credits	5, 509, 997. 45
Estimated total expenditures	5, 200, 000. 00
Estimated balance to credit of city June 30, 1905---	309, 997. 45

If, however, it appears that after half the coming fiscal year has passed that the revenues exceed the estimates, the Board will endeavor to obtain from the Philippine Commission a further appropriation for necessary and urgent improvements.

ENGINEERING AND PUBLIC WORKS.

In the annual report of the last fiscal year the Board announced the granting of franchises for an electric railway and an electric light and power company. A syndicate organized by Charles M. Swift, the grantee, and the J. G. White Co. have carried on the work of building the road in a prompt and business-like manner. The construction has been done by the J. G. White Co., and at the end of the fiscal year a large portion of the tracks of the system are in position, and work is progressing rapidly on the erection of the power stations and general offices. It was anticipated that the broad excavations in narrow streets which were necessary to permit the laying of rails would seriously impede traffic and be a matter of great inconvenience in all sections of the city, but under the careful management of Mr. H. C. Belden and Mr. John Reid, of the J. G. White Co., and Mr. R. T. Laffin, representing Charles M. Swift, holder of the franchise, the public was put to very slight inconvenience. The company promises to operate the Malate-Ermita section of the road by the 1st of January, and altogether the Board is very well satisfied with the method of installation of the system.

The year has been marked by unusual activity in all branches of the Department of Engineering and Public Works, and this was especially true with reference to street construction and bridge work. In addition to the usual repairs throughout all sections of the city and the approval of plans for the widening of streets in the crowded districts a complete system of new streets has been approved to include all those districts which were without streets or without a proper system of streets. A number of new streets have been constructed in Ermita and Malate,

properly graded and built complete with curbs and sidewalks, thus opening a very desirable residence section. Nearly the full length of Calle Rosario is paved with Australian wood blocks laid on a bed of concrete. The contract has also been let for the paving of the Escolta with similar blocks, and when this work is completed there will be a continuous improved pavement from the Plaza Santa Cruz to Plaza Calderon de la Barca, forming a smooth highway through the busiest section of the city. The improvement of Calle Rosario has shown how remarkably traffic can be facilitated by proper pavement, and the ease and speed with which vehicles can pass through what was formerly a most crowded and uneven thoroughfare is a valuable object lesson.

Three new openings were made through the city wall connecting the interior with the Malecon and the Bagumbayan Drive at Calles Aduana, Victoria, and Palacio. The Aduana cut forms a straight extension of the street of that name to the offices of the port works and gives direct access to the quartermaster's offices and warehouses. In addition to facilitating traffic at this point the fire protection is very much improved by reason of the proximity of the Intramuros fire station, the apparatus from which can be brought by a straight run to the Malecon, whereas before it would have been necessary to pass by narrow streets through the narrow gates of Santa Lucia or Postigo.

The contract for erecting a lift bridge over the Binondo Canal at Calle Soledad was awarded to Germann & Co. over five other bidders at a cost of ₱39,580. Plans have been prepared and approved for the construction of a bridge over the Pasig to replace the present Ayala Bridge, and bids have been called for through the Bureau of Insular Affairs at Washington, the same to be opened in December, 1904.

The scope of the Department of Street Cleaning, Parks, and Collection and Disposal of City Refuse has been greatly extended and a thorough organization has materially increased its efficiency. There is not a street in the city which is not cleaned at regular intervals, and the residents have come to appreciate the improved conditions to such an extent that if, by reason of storm or occasional negligence, the block is overlooked the Board is promptly notified of the fact by a petition or complaint from those affected. Owing to the excellent organization such complaints are exceedingly rare. For some reason, as yet unexplained, the residents of the barrio of San Felipe object to the employees of this department cleaning the streets in that barrio, but it is believed that this difficulty will soon be adjusted.

In February, 1904, the pail system, formerly managed by the Insular Board of Health, was transferred to this department, with the result that the efficiency of the system has been very largely increased. A very large number of new installations have been made at the request of the property owners, and the working expenses have been reduced by almost one-half. As the system is being further perfected and extended

the considerable expense will be materially reduced. This work, together with the collection of garbage and rubbish, is quietly performed during the hours of the night, so that the residents are hardly aware of the manner in which the streets are cleaned. All the night soil, etc., is transferred to the steam barge *Pluto* at its wharf on the south bank of the Pasig and dumped at sea. The garbage is burned at the city crematories in Palomar, Santa Cruz, and Paco. That portion of the rubbish which is available for filling is hauled to certain low spots which are gradually being brought up to the level of the surrounding ground, and these dumps are carefully protected by a liberal use of sand and disinfectants where necessary.

Altogether the sanitary condition of the city is much advanced over that of last year.

The erection of a proper veterinary hospital at the city stables at Palomar, and the grading and draining of the ground, have worked a marked improvement in the general condition and the health of the stock. The animals work every day and, owing to the increased operations of the department and the long distances that many of the carts must travel before the regular work is commenced, it is believed that the ration now supplied must be increased, and recommendations to this effect have been requested from a competent board.

The improvement in all parks and plazas of the city has been steady and noticeable, although the work being carried on at the present time is more or less of a temporary nature—no large or permanent improvements being undertaken—owing to the expected early arrival of a landscape architect, who will undertake a thorough study of conditions and plan a general park system, which can be gradually carried out by the Engineering Department. The natural facilities afforded by the broad Bagumbayan Drive and the property on both sides, including the moat and walls, can not be overestimated, and with the proper development and the judicious placing of public buildings this portion of the city can be made to surpass any city in the Orient and the equal of many of the most beautiful and famous spots of the cities of the United States.

As the capacity of the old cemeteries and the church cemeteries is almost exhausted, a tract of land near La Loma, containing 125½ acres, was purchased and reserved for cemetery purposes under the name of Cementerio del Norte. The development work has been carried on in a satisfactory manner, avenues and streets being laid out, trees planted, and about 50 acres graded and provided with drainage. Six sections were set aside for the reception of the pauper dead, and two of these have already been filled.

The Superintendent of Water Supply and Sewers presents a detailed report under the head of "General observations on a system of storm-water drainage." This question is one which must be taken up in

connection with the installation of sewers, as a very large amount of storm water precludes the possibility of using the sewers for surface drainage. Practically the entire system of water supply and the more or less temporary drains and sewers have been overhauled, and much work has been done in remodeling or extending the present system to conform to the new water supply, plans for which have already been approved. There was no shortage of water during this year, partly owing to the moderate temperature and abundant rainfall and partly also to the excellent condition of the old pumping station at Santolan and the Deposito. The detailed report indicates the large amount of work which has been done in overhauling installations and improving the fire-hydrant service and house connections.

The Department of Buildings and Plumbing Inspection has been reorganized and consolidated, and a very large amount of work has been accomplished. The following is a comparative statement of the operations of that department for the fiscal years 1903-4:

Operations of the Department of Buildings and Plumbing Inspection.

FISCAL YEAR 1903.

	Number of permits.	Estimated value	
		United States currency.	Philippine currency.
Strong materials:			
For buildings	873	\$1,946,871	₱3,893,742
For repairs	519	171,741	343,482
Light materials:			
For buildings	2,242	189,580	379,160
For repairs	702	26,322	52,644
Total			4,669,028

FISCAL YEAR 1904.

Strong materials:			
For buildings	1,041		₱3,380,853
For repairs	642		402,776
Light materials:			
For buildings	2,832		455,752
For repairs	623		50,864
Total			4,290,245

The total estimated value of all classes of building operations for 1904 shows a decrease of ₱378,783, in spite of the fact that a large number of permits were issued for new buildings of strong materials and for repairs to buildings of strong materials and also for new buildings of light materials. This decrease is explained by the fact that permits were issued for a number of large constructions, such as the general offices of the Tabacalera, the warehouses of the same company, and the group of houses of Mr. Robles Lahesa. This work has been carried on into the fiscal year 1904, but, for purposes of record, the

whole estimated expenditure occurs in the statement for 1903, the period in which the permits were issued.

The city purchased from the Cosmopolitan Hospital Association the unfinished building destined for hospital purposes for \$50,000, Mexican currency, less the cost of strengthening the foundations and the framework of the then-existing structure. The contract for the construction of the present building was let to Messrs. Cadwallader & Co. The work was completed in March at a cost of ₱143,443.74, and the municipal offices were moved from the temporary quarters in the Calle Victoria School. This temporary city hall is a three-story frame structure covering a ground area of 16,500 square feet, with a frontage of 150 feet on Calle Bagumbayan and 110 feet on Calle Concepcion, and all the departments of the city, with the exception of the offices of the City Assessor and Collector and the Municipal Court, are now in this building. The veterinary hospital, covering a ground area of 135 by 40 feet, was built by contract at a cost of ₱10,829.83, adjoining the Palomar stables. The construction of the Tanduay fire station was completed at a cost of ₱54,761.30. This building is constructed of brick and frame, two stories high, and covers a ground area of 61 by 78 feet. The Tondo police station is nearing completion, and will be by far the most modern and best equipped police station in the city. The plans called for a substantial two-story structure of brick and cement, properly equipped with special police conveniences, such as cells and excellent sanitary arrangements and offices and dormitories for the men, and covers a ground area of 47 by 66 feet. The contract price was ₱26,607. An auxiliary fire station in the District of Tondo, with a capacity for housing one company, was built by contract at a cost of ₱3,745.

Prior to January 1 the plumbing work of the city was carried on under a more or less unsatisfactory system of inspection. During the last three years the installation of modern plumbing has increased very largely, and many so-called plumbers have set up in business who are entirely without the proper knowledge of sanitary plumbing. The poor work done by these men has caused property owners great inconvenience, in many cases the job being left unfinished, or, when finished, failing to meet with the approval of the Board of Health. A committee has been at work for some time on special plumbing regulations designed to fit the peculiar sanitary conditions of Manila, and this report is to be embodied in the sanitary code of the Board of Health. A special officer has been appointed to examine and pass on the plans submitted by plumbers for installations, but until such time as the sanitary code is put into effect this work can not be on a satisfactory basis.

The drafting department has been largely employed in perfecting plans for the straightening and widening of streets and in improvements designed to facilitate traffic in congested districts. Survey and map work

has been pushed so that all the more important streets have been resurveyed and plotted on permanent maps, which have been approved by the Municipal Board. These plans and maps are countersigned by the City Engineer and the Secretary of the Board. This office produced plans for the lift bridge over the Binondo Canal and the new bridge to replace the present Ayala Bridge over the Pasig River.

In accordance with Act No. 669 of the United States Philippine Commission and Act No. 1094 appropriating the necessary money, plans were prepared and contract awarded for construction of a concrete retaining wall along the south bank of the Pasig River south of the Bridge of Spain. The amount expended to June 30, 1904, was ₱24,732.50. When completed this wall will be 1,000 feet in length with a depth of channel, at low water, of 18 feet, which it is expected will greatly facilitate shipping operations in this crowded section of the river. The old river wall fronting on this improvement is being removed by prison labor, and with the filling out of the new river wall about 7,600 square meters will be reclaimed.

The tenement houses built by the city have been well filled throughout the year, and have accommodated in a sanitary and proper manner a large number of people. The following statement indicates the business done by this establishment:

Tenement houses.

Assessed valuation of ground	₱13,306.00
Assessed valuation of improvements	11,838.00
Total valuation	<u>25,144.00</u>
Gross revenue for the year (10 tenements, at ₱7, and 10 tenements, at ₱8)	1,800.00
Cost of supplying water free to the tenants.....	₱194.42
Cost of repairs to building	<u>12.03</u>
Total expense	<u>206.45</u>
Net revenue	1,593.55
Or 6.3 per cent of the investment. This does not include taxes or insurance.	

On February 17, the committee on engineering and public works, having previously consulted with the Superintendent of City Schools, presented a scheme for the submission of competitive plans and specifications for a modern school building, to be erected in the District of Trozo at a cost of not more than ₱120,000. As the building was to cost so large an amount of money, and as it was the desire of the Board to construct a school edifice which should be a model not only for the city but for the Islands, it was considered that a competition among architects with a reasonable prize and offer of employment in supervision would attract the best skill and especially appeal to the Filipino architects and builders, who were thoroughly acquainted with

the needs of the climate and weather conditions. The prize authorized was ₱1,000 to the successful bidder, and employment in the preparation of working plans and specifications and the duty of supervising architect for the erection of the edifice, for which a compensation of 5 per cent of the total cost of the building was authorized, the same to be paid in two installments. Having approved of the competition the necessary notice to architects was published in Spanish and English papers. On June 1 the five plans submitted were opened, proper precautions having been taken for concealing the identity of competitors until after the award had been made, and all plans and papers were forwarded to the committee of award, which was composed of Dr. O'Reilly, Superintendent of City Schools; Señor Miguel Velasco, member Municipal Board and president of the Advisory Board; the Insular architect, Señor R. Yruretagoyena, of the Tabacalera, and Mr. Herman Krusi, of the Atlantic, Gulf and Pacific Company. After due consideration of the plans this committee of award gave the prize to plan No. 1, submitted by Mr. William Waters, jr. However, owing to the lengthy deliberations of this committee, the award was not made within the period of the fiscal year covered by this report. With slight modifications it is believed that the prize plan will provide a very satisfactory building of ornamental design with a school-room capacity larger and more comfortable than that offered by any other school building in the Islands. The competition is regarded as successful.

The annual report for the last fiscal year was marked by the announcement of the preparation of plans, survey, and complete study of a new water system, this study having been accomplished by Mr. J. F. Case. At the end of this fiscal year the Board announces the preparation of plans, surveys, and a complete study of a sewer system, accomplished by Mr. O. L. Ingalls, and the digested reports on both these systems by Consulting Engineer Fitzgerald, who was secured as an expert to examine and report, with recommendations on these subjects.

On September 23, 1903, Mr. O. L. Ingalls was relieved from duty as City Engineer and was succeeded by J. F. Case, who had recently accomplished his study of the water system. Mr. Ingalls was appointed engineer in charge of Manila sewer system and immediately commenced work thereon. His report was presented on February 1, 1904, the system being designed to accommodate a population of 441,000, this being considered the natural increase from the present figure (223,000) which might be expected in fifty years. The total cost of the system is estimated at ₱3,216,473.30. The cost was divided in the following manner: The estimate on the work of the south side of the river is ₱2,083,241.70, and for that part of the system on the north side of the river, ₱1,133,231.69.

Mr. Fitzgerald began his work of reviewing and experting the plans for the two systems on February 17. His report on the water system,

contained in this general report, was presented on April 28, and the report on the sewer system, also appearing in this general report, was presented on May 12. Mr. Fitzgerald expresses some difference of opinion from certain features of the sewerage report, notably with regard to one pumping station on the north side of the river in place of two pumping stations, including one on the south side of the river, which latter was incorporated in the plan presented by the engineer in charge of the sewer system. These are matters which must be settled prior to the commencement of the work. The water system is practically approved as presented by the City Engineer.

It is likely that the Board will take action looking to the early issuance of the bonds authorized by Congress for the purpose of raising money to begin work on these two very important and very urgently necessary systems. At the same time that the bond issue for these purposes is considered it is deemed advisable to investigate the possibility of securing the privilege of additional municipal bonds for general public improvements. In addition to the enormous amount of routine and repair work, which exhausts practically all the reasonable revenue which might be expected from a city of this size and commercial position, all public improvements of a general and permanent nature have been paid out of these current revenues. When this is considered it is little short of extraordinary that so much has been accomplished in the short period of civil government in the way of new and costly buildings urgently needed for the various departments, the large areas of street extensions, park improvements, and extensive development of the water service.

The widening of Calle Nueva, Ermita-Malate, was commenced, and at the end of the fiscal year nearly all the property owners on both sides of the street throughout its entire extension have been seen and interested in the movement, and about 10 per cent of the property owners have made agreements to sell the strips necessary for widening at stipulated prices. The original committee appointed for the purpose of considering and making recommendations concerning the widening of this important street was composed of Señor Infante, of the Advisory Board; and C. H. Dutton, of the City Engineer's Office, with Member McDonnell as chairman. Detail plans of each piece of property to be cut by the widening, showing thereon the extent of the property to be taken and, in various cases, fences or portions of houses to be removed, were sent to each property owner for his information. These plans contain the names of the owners and the assessed valuation. A separate letter was sent in each case explaining the project to the property owner, and notice was given that a meeting would be held one month later. On January 30, 1904, a meeting of all property holders interested was held in the school building of Ermita and, after the general scheme of widening had been explained, those present were requested to express their opinions.

While there were some who objected to the widening of the street at all the majority were heartily in favor of the improvement, and by vote it was decided that the street should be widened to 15 meters instead of 13 meters, which was the width originally proposed by the Board.

This action of the property holders and their interest in the work is an encouraging sign and indicative of the character of development of streets which is being carried out on a smaller scale in many districts of the city.

The committee established office hours and received property owners almost every day. Innumerable questions were brought up regarding special damages, loss of rent, estimates of value of fences, gardens, removals of sections of houses, etc., and the residents throughout the northern half of the street promptly manifested interest and expressed themselves as willing to accept the assessed valuations of property and reasonable damages in case of the destruction or removal of improvements. It is the intention of the city to lay out sidewalks and set out trees as fast as the blocks are widened. On February 19 the chairman, being about to go on vacation, was succeeded by Member Sleeper, who has carried out the work with success and energy, and is fast nearing the point where one or two model blocks can be prepared which will be an example for the entire city. The method in dealing with property owners has been to reach an agreement which is recorded on a typewritten form wherein the property owner agrees to sell to the city the necessary ground, improvements, etc., as the case may be, at the price stated, and, furthermore, agrees to the amount of damages. This provisional agreement is presented to the Board for final approval and, in case of approval, the necessary papers are prepared and the city purchases the property and settles the damages. It is a satisfactory and expeditious method of handling these numerous small strips which are necessary for the widening.

One of the most important pieces of work in the general scheme for improvement of streets is the approved plan for the consolidation of the parallel calles, Dulumbayan and Salcedo, made possible by the removal of the seven uneven blocks of buildings between those two streets and bounded by Calle Carriedo and Calle Iris. The total value of improvements which must be purchased and removed is ₱151,000; the total value of the land to be purchased and converted into street area is ₱63,678, making the total cost of the necessary ground and the removal of buildings, etc., ₱214,678. Two lots have already been purchased and the work will proceed as fast as possible with the available appropriations, advantage being taken of the condemnations of old buildings or the destruction of any buildings in this section. When the work is completed there will be a splendid street 30 meters in width through one of the busiest sections, largely inhabited by Filipinos and Chinos and very

valuable for commercial purposes. This street will give direct access, through the extension of Calle Dulumbayan—known as Calle Cervantes—to the general street system on the north side of Calle Iris, which is largely embraced within the limits of the San Lazaro estate.

The work of installing cement curbing on Calle Cervantes from Bilibid to Quiricada was commenced during the month of May, 1904, and is still in progress, 1,539.6 linear meters of cement curbing having been installed at a cost of ₱3,205.24, or ₱2.08 per linear meter; 12,606 square meters of the roadway of this street has also been resurfaced at a cost of ₱3,725.16, or ₱0.28 per square meter. The work of straightening Calle Oroquieta from Lopez de Vega to Quiricada was commenced during the month of May, but it had to be abandoned on account of the rainy season.

A contract for 6,000 cubic meters of earth filling for the streets in this district was let on June 24, 1904, at a price of ₱2 per cubic meter. When this filling is completed it will be possible to gravel the roadways so as to make them passable to light traffic.

POLICE DEPARTMENT.

As promised in the annual report of 1903, the Municipal Board, with the coöperation of the Civil Service Board and the officers of the Police Department, considered at length the subject of an increase of pay based on length of service for all grades to the rank of second-class lieutenants and first-class sergeants. The officers in the respective branches above these positions have not been increased. The recommendations of the Municipal Board were presented in detail to the Commission and the following schedule of service pay was adopted and is now in force:

First-class patrolmen: First year, \$900; second year, \$1,000; third year, \$1,080; fourth year, \$1,140.

Second-class patrolmen: First year, \$300; second year, \$375; third year, \$412; fourth year, \$450.

Third-class patrolmen: First year, \$240; second year, \$300; third year, \$330; fourth year \$360.

The number of patrolmen who have been affected by the increase of pay is as follows:

First-class patrolmen: Second year, 55; third year, 51; fourth year, 83; total, 189.

Second-class patrolmen: Second year, none; third year, 12; fourth year, 7; total, 19.

Third-class patrolmen: Second year, 57; third year, 70; fourth year, 99; total, 226.

Increases in other positions were as follows: Three second-class lieutenants, from \$1,200 to \$1,300 per annum; first-class sergeants, from \$1,200 to \$1,300 per annum; roundsmen, from \$1,020 per annum to

\$1,200. Second-class: Sergeants, from \$450 to \$600 per annum; roundsmen, from \$375 to \$480 per annum.

It is believed that this material increase of pay will greatly benefit the department and provide an incentive to continuous service which has hitherto been lacking.

The record of appointments and separations in the department were as follows:

Probational appointments:	
Americans	179
Natives	126
Total	305
Temporary appointments:	
Americans	103
Natives	2
Total	105
Grand total	410
Discharges:	
At own request—	
Americans	221
Natives	46
Total	267
For good of service—	
Americans	59
Natives	92
Total	151
Incompetency—	
Americans	1
Natives	6
Total	7
For sickness exceeding six months and not in accordance with present law in force:	
American	1
Deaths:	
Americans	4
Natives	2
Total	6
Grand total of discharges	432

In order that the commissioned officers of the department should be thoroughly familiar with duty in all districts of the city, and for many other good and sufficient reasons, a general change in precinct commanders was made at the beginning of the present year. The transfers were as follows:

Capt. Mark Scott, precinct 2 to precinct 4; Capt. Jack Dawson, precinct 1 to precinct 2; Captain Crowley, precinct 3 to precinct 1;

Captain Wilson, river and harbor police to precinct 3; Sergt. Wm. E. Wichman, precinct 3, placed in command of river and harbor police.

These changes in no way reflect upon the past services of the officers concerned, and good results are already being observed.

The study of English has been continued in all native precincts, and six night schools are at present maintained. Two hundred and seven American patrolmen possess a working knowledge of Spanish; 79 have a working knowledge of Tagalog, and 47 are familiar with both languages. As the work of the entire force is largely among Tagalog-speaking people a knowledge of this language is of the greatest benefit. Fourteen native patrolmen have been detailed as sanitary inspectors to assist in the prosecution of the work of the Board of Health, and the service has been satisfactory.

During the fiscal year there were 17,383 arrests, divided as follows: Males, 14,858; females, 2,525—a decrease of 135 over the fiscal year 1903. There were 3,484 arrests for gambling and 256 for conducting a gambling house, both of which totals are slightly in excess of the record in 1903. The prosecution of gamblers was carried on most vigorously until the more important rings were broken up, and in many cases the members were forced to leave the city. This vigorous action of the police, combined with severe punishment by the Government, has served to materially decrease the number of employees who formerly frequented the gambling games.

There has been a noticeable decrease in the number of seditious plays which have been presented in the thickly populated native districts, which is partly due to the vigorous campaign carried on against the presentation of these plays and partly to the waning of the spirit which prompted them by reason of the changed conditions and the increased general quiet of the city.

Plans and specifications were prepared by the City Engineer's office and approved by the Board and a contract has been awarded for a model police station of brick and stone in the District of Tondo at a cost of ₱25,400. This building is well under way, and it will be possible to vacate the present unsatisfactory quarters in July or August of this year. The building contains ample provisions for a dormitory, schoolroom, clean and sanitary cells, and commodious offices. The station is being erected on a piece of ground which is sufficiently large to provide a good drill ground and convenient space for installation of athletic appliances.

The installation of a fire pump and sufficient hose on the police launch *Buckey O'Neill* has proved a success in many cases, the launch being able to render valuable assistance to craft in the bay and river and to cooperate with the Fire Department in cases where the fire was on a street near the water front. It will be seen in the detailed report by

precincts of the operations of the department that the police have frequently extinguished small fires before the fire apparatus arrived. In most of these cases the proper action by the occupants of the house would have prevented the necessity of turning in an alarm, and the police by prompt action have been able to control the situation or direct the efforts of the natives toward extinguishing the blaze before it had reached any serious proportions.

The Chief of the Secret Service reports a material decrease in the number of arrests as compared with the fiscal year 1903, but declares there has been no decrease in the actual work, as the cases, as a rule, have been of much importance, necessitating close attention and detail work. The actual numerical decrease is found in the smaller number of arrests for such minor offenses as vagrancy, gambling, and petty larceny. During the year stolen property and money were recovered by the Secret Service Bureau as follows:

Property recovered	₱32,604.71
Money recovered	11,880.81
Total	44,485.52

The Bureau has achieved much success in arresting and prosecuting the members of several organized bands of petty thieves who have infested various sections of the city. The bands were largely recruited with ex-convicts, but they contained many boys, who were thus literally enrolled in a school of crime. Many of the members of these thieving gangs would be proper subjects for a reform school, which institution is sadly needed. The practice of sending young lawbreakers to Bilibid has in many instances proved disadvantageous, as they have merely fallen into the company of more experienced criminals, and only await their freedom to indulge in experiments with their increased knowledge.

The Chief of the Secret Service again makes recommendations concerning the conferring of rank on the officers of the Bureau.

The receipts of the police fund for the year amounted to ₱5,442.67, and the expenditures were ₱1,336.90, leaving a balance on hand of ₱4,105.77. This sum is deposited in the Chartered Bank.

The committees on police and fire have drawn preliminary regulations providing for the formation of a police and fire relief association, which it is proposed to establish from the fines imposed in the two departments. Such an association would be of great benefit to the policemen and firemen.

The health of the department has been excellent, there being only six deaths during the entire year.

The reports of the Chief of Police and the Chief of the Secret Service, herewith attached, give an extensive and detailed history of the work of the department during the past year.

LAW DEPARTMENT.

The steady increase in the work of the Law Department in its different branches is in accord with the progress of the other city departments. Said department includes the following offices:

OFFICE OF THE CITY ATTORNEY.

The most important work of this office, in addition to the defense of the interests and rights of the city in the courts of justice, is to draft and prepare contracts and ordinances, to perfect the legal title and procure the registration in the registry of property of the real estate belonging to the city as well as that acquired by the same, and to bring to light and investigate city property which is illegally held by others. The City Attorney also gives legal opinions upon all matters which may be referred to him by the Municipal Board and the other departments. This office has represented the city in eighty suits in courts of justice, and, if we except the claims presented against it by the religious corporations of San Francisco and Santo Domingo for the purpose of obtaining for their property exemption from the payment of the land tax, in the majority of them the city has been successful. Seventeen ordinances have been prepared and 133 legal opinions have been given to the various departments of the city and 85 contracts have been drafted and prepared:

The amount involved in the suits pending in which the city is interested as plaintiff or defendant amounts to approximately 453,750.90 pesos or \$226,875.95, United States currency, as follows:

Estefania Villar <i>vs.</i> the City	\$17. 00
City <i>vs.</i> Chinese Chamber of Commerce	37, 200. 00
City <i>vs.</i> Jacinto del Rosario	2, 500. 00
City <i>vs.</i> Leonarda Salgado	10, 000. 00
City <i>vs.</i> Walter Morley	1, 080. 00
John Hoey <i>vs.</i> The City	450. 00
City <i>vs.</i> Dy Feco et al	125. 00
City <i>vs.</i> Basa y Marifosque	5, 000. 00
Francisco Merchan <i>vs.</i> The City	2, 812. 00
Enrique Ma. Barretto <i>vs.</i> The City	4, 500. 00
City <i>vs.</i> Francisco Gambe et al	5, 000. 00
City <i>vs.</i> Monte de Piedad	67, 000. 00
Ildefonso Tambunting <i>vs.</i> The City	2, 500. 00
Application of city to register land in Paco	6, 905. 00
Palacio Arzobispal <i>vs.</i> The City	1, 604. 47
The Jesuit Order <i>vs.</i> The City	979. 98
Chang Tang Ling <i>vs.</i> The City	1, 000. 00
Opposition of city to registration of land in Calle Vito Cruz	500. 00
The City <i>vs.</i> Jover y Costas	12, 500. 00
City <i>vs.</i> Tuason et al	5, 000. 00
Canuto Reyes <i>vs.</i> The City	500. 00
Registration of land in block 82, Tondo	40, 000. 00
City <i>vs.</i> Enrique Rodriguez	2, 596. 00

City <i>vs.</i> E. B. Merchant	\$75. 00
City <i>vs.</i> José Machuca	50. 00
Verisimo Vasquez <i>vs.</i> The City	2, 460. 00
Esperanza Oteroy Trigas <i>vs.</i> The City	7, 492. 00
T. M. Beech <i>vs.</i> The City	250. 00
Antonio de la Riva <i>vs.</i> The City	1, 500. 00
The City <i>vs.</i> Yu Kumiyan	10. 00
The City <i>vs.</i> E. B. Merchant	160. 00
Marcelo Benavides <i>vs.</i> The City	1, 886. 50
The City <i>vs.</i> E. B. Merchant	1, 500. 00
Juana G. Abellana <i>vs.</i> The City	2, 723. 00
Total	226, 875. 95

The widening and opening of various streets has given rise to a large amount of legal work, including the examination of title papers, the remedying of defective titles, and the preparation of deeds for land taken. This in many cases has necessitated the appointment of guardians to convey property belonging to minors. In such cases this office has instituted and conducted the proceedings to completion.

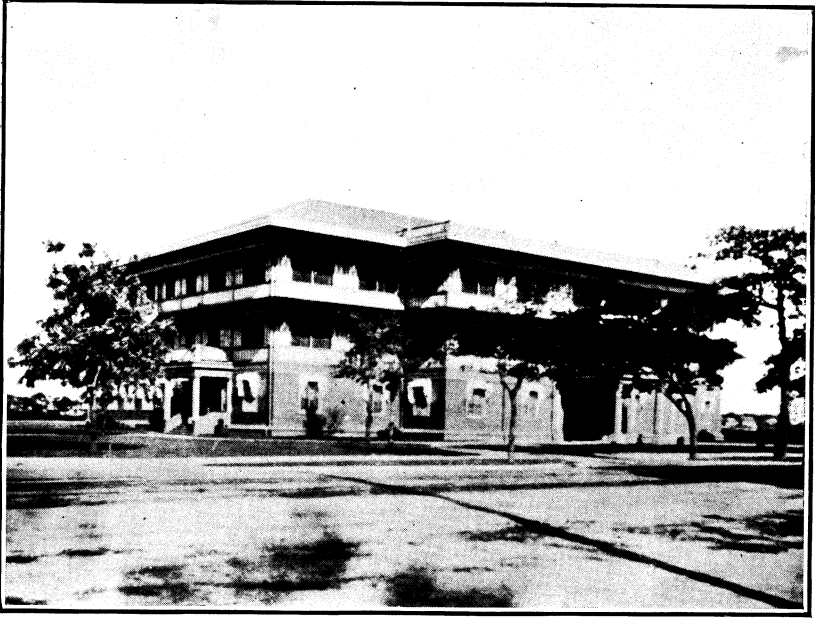
OFFICE OF THE PROSECUTING ATTORNEY.

Four thousand one hundred and thirty-four is the number of investigations conducted by this office which have resulted in 534 complaints filed with the Court of First Instance and 801 filed with the Municipal Court.

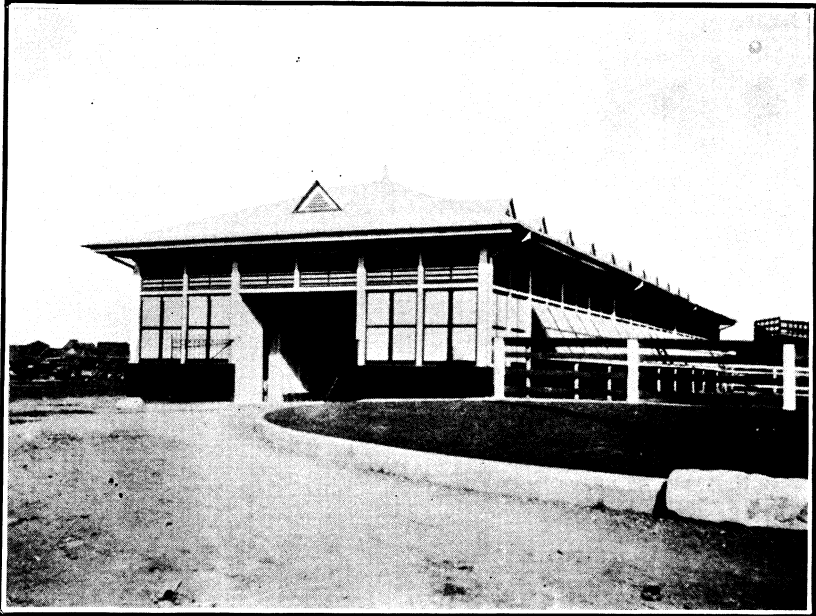
A comparison of the volume of business of this office during the past year with that accomplished during the year preceding it shows that in the fiscal year ending June 30, 1903, there were 472 cases instituted in the Court of First Instance, while during the fiscal year ending June 30, 1904, there were 534 cases instituted, an increase of 13.1 per cent. During the fiscal year 1903 there were 270 convictions, while in the fiscal year 1904 there were 364 convictions. In the Municipal Court during the first year mentioned there were 592 cases instituted, while during the last fiscal year there were 801 cases instituted, an increase of 35.3 per cent. In the same court during the first-mentioned year there were 279 convictions secured, while during the last fiscal year there were 560 convictions.

MUNICIPAL COURT.

The number of persons accused before this court for violation of the municipal ordinances or less grave offenses rises to 17,046, of which only 1,925 have been acquitted, 3,110 have been sent to Bilibid to serve a sentence in prison, and the rest have been punished with fines which were paid by them, and which amount to the considerable sum of \$75,274.20. Of the 3,110 persons sent to Bilibid 2,185 were for failure to pay fines, and, adding this item to the sum of \$75,274.20, which represents the amounts collected, it gives an average of more than \$5 fine for each one of the defendants, which shows an excessive rigor on



NEW TEMPORARY CITY HALL BUILDING.
(Cost \$143,443.74 completed.)



VETERINARY HOSPITAL, PALOMAR ISLAND, EXTERIOR.

the part of the judges in the imposition of fines, a rigor which ought to be modified inasmuch as the majority of the persons accused before this court are extremely poor and ignorant of the ordinances and laws for which violation they are so severely punished, hence the general clamor existing on the part of the most numerous class of the people against the proceedings followed in this court and the excessiveness of the punishments which it imposes.

Gambling cases have supplied to said court 3,606 persons sentenced to punishment, which seems very extraordinary since prohibited gamblings are severely punished by the municipal ordinances, but the explanation of this fact is found in the monthly reports of the Municipal Court, which show that games of mere entertainment of Filipino families, such as "panguingui," which does not appear of the same character as gambling, have been punished by this court.

OFFICE OF THE SHERIFF OF MANILA.

The work of this office has materially increased during the last year. A comparison of the work performed during the fiscal year 1902-3 with that of 1903-4 shows a marked increase throughout the entire list given below:

Nature of work performed.	1902-3.	1903-4.
Citations in criminal cases	3,051	4,758
Orders of arrest, criminal cases	700	912
Search warrants	14	49
Executions in civil cases	302	484
Attachments in civil cases	80	159
Orders of ouster in civil cases	117	140
Sales advertised	62	137

The income of the office for the period mentioned, derived from official fees, is ₱6,347.44 collected in Philippine currency, and \$4,803.54 in local currency. This revenue has been derived almost exclusively from civil matters, an occasional fee for criminal business being paid. The criminal business of the office, almost in its entirety, furnished no income, while it occupies more than half the time and about two-thirds of the expense of the Sheriff's office. The transfer, commitment, incarceration, and release of prisoners require the exclusive service of three deputy sheriffs, the maintenance of two American mules, and the use of a prison van and appurtenances, in addition to the incidental services furnished by the remainder of the force and the clerical work involved.

JUSTICE-OF-THE-PEACE COURTS.

The two courts have tried 1,530 cases. Of these 1,050 were for the recovery of sums of money, 277 for the recovery of possession of real property, 196 to secure return of personal property, 7 for specific performance, and they have transacted other matters pertaining to their

office. They collected as fees \$2,608.43, local currency; \$22.85, United States currency, and ₱2,558.30, Philippine currency.

FIRE DEPARTMENT.

Perhaps the most important event which has occurred during the fiscal year with relation to the Fire Department has been the increase in salaries authorized by the Philippine Commission, which has made it possible to obtain and retain capable and efficient men. Increases of salaries of firemen are now based upon the length of service and along parallel lines with the increases made in the Police Department.

The strength of the department has been increased by 22 firemen, 2 clerks, and 1 mechanic, and consists of 75 Americans and 50 Filipinos.

The organization is composed of one Chief, 1 assistant chief, 1 electrician, 1 chief engineer, 1 assistant electrician, 4 clerks, 6 linemen, and 1 mechanic at headquarters, and 5 engine companies, 4 chemical-engine companies, and 2 hook-and-ladder companies, occupying 5 stations completely equipped with modern apparatus, with 1 steam engine and 2 hose wagons in reserve.

The Tanduay fire station has been completed upon the plot of ground formerly occupied by the temporary station, corner of Concordia and Romero Aquino, at an expense of ₱54,761.30. It is a handsome, permanent building, housing an engine company, hook-and-ladder company, and chemical company, giving protection in a district in which there are many valuable buildings and which has heretofore only had partial protection.

A temporary station is also being erected in the District of Tondo, with a view if possible to preventing the large nipa fires which have always prevailed in the past in this district. The building should be completed and occupied by the 1st of September, 1904, and with the organization of companies for this district will complete the permanent plans of the Board for fire protection with the exception of the fire boat and some auxiliary apparatus, although it is believed it will be necessary to build permanent stations in the near future in Tondo, Paco, and Intramuros.

The improvement of the grounds around all the fire stations is being undertaken with a view to beautifying the city.

The question of proper fire horses for the department has not yet been satisfactorily solved, although the department is better equipped at present than ever before, but arrangements have been made to bring from the United States in August thirty geldings of sufficient size and suitable for Fire Department purposes and to transfer the present animals to the Engineering Department.

The department has received during the year two new fourth-class Metropolitan engines and one Waterous gasoline engine.

One fourth-class engine has been put in the Tanduay District, and the other one has replaced the Merriweather engine in Intramuros which

has been extensively repaired and will be used in the new Tondo station. The gasoline engine has been turned over temporarily, for the protection of the extensive improvements on Engineer Island, to the Bureau of Coast Guard and Transportation, but it is hoped during the year to have this engine returned and placed in service in the Santa Mesa District, which is rapidly being built up and will shortly be in need of additional fire protection. Experimental test with this engine was very satisfactory, but no actual work has yet been performed at fires, and thus its utility and practicability can not be stated.

The records of the department show that during the year 101 alarms of fire were received, being an increase of 16 over the previous year. The aggregate losses amount to ₱468,911, or about 25 per cent of the losses of the year previous.

Of the 101 alarms received 4 were false, and the causes for the remaining 97 fires are reported as follows:

Overturned lamps.....	16
Lamp explosions.....	10
Unknown.....	9
Lighted cigars and cigarettes.....	6
Chimneys burnt out.....	4
Gasoline explosions.....	4
Spontaneous combustion and carelessness in use of charcoal, 3 each.....	6
Defective flues, lighted cigarette, rubbish, sparks from a forge, 2 each.....	8
Various causes detailed in report of Chief, 1 each.....	34
Total.....	97

There appears to have been only one fire which can be said to have been of incendiary origin during the year, and this is doubtful.

The department was successful in checking the advance of five large fires which had gained considerable headway before alarms were received, and if any one of these fires had not been controlled it would have caused great loss. These fires were:

Date.	Location of building.	Occupant of building.	Loss.
Aug. 28, 1903	95 Escolta.....	Emilio Brammer.....	₱30,000
Sept. 29, 1903	105 Escolta.....	Till's Photo Studio.....	22,400
Oct. 26, 1903	3 Lara.....	Macleod & Co. (hemp warehouse).....	152,000
Apr. 11, 1904	195 Binondo Estero.....	Chinese stores.....	69,770
Apr. 29, 1904	98 Escolta.....	Indian Bazaar.....	107,000

The Escolta fires and the Lara fire were confined almost entirely to the immediate building in which they originated, but the fire on the Binondo Canal had spread through almost half a block before the arrival of the department. As the entire department was immediately summoned the fire was checked, thus saving the remainder of the block.

In these large fires the fact was noticeable that had there been a salvage corps in Manila a large amount of property would have been saved,

and to this end on two occasions communications have been sent to the Fire Insurance Association of Manila calling attention to this fact and inviting the association to organize an underwriters' patrol, to consist of a modern wagon with tarpaulins, etc., with a small personnel, which would be given stable room in one of the fire stations, and thus the loss from water at fires could be materially reduced. It is estimated that the salvage at the five fires above mentioned, if such an organization had been in existence, would have been at least 30 per cent of the entire losses, or enough to maintain such an organization, including the initial cost of the apparatus and horses, for several years, and it is understood the matter has been taken up with the home offices of the insurance companies with a view in the near future to establishing such an underwriter's patrol.

There were three serious fires in nipa buildings during the year threatening nipa districts and endangering other properties in Ermita, Trozo, and Gagalangin, but through the efforts of the department the fires were confined to comparatively small areas.

In the past such nipa fires have periodically consumed large areas, and it has been with this in view that the Board has established a fire station in Tondo, where a company will be organized and stationed before September 1.

The installation of large water mains and modern post fire hydrants in the more important districts of the city has greatly facilitated the work of the Fire Department and rendered the supply of water sufficient for fire purposes. The proposed continuation of the work throughout the city will within the present year give the department all the water that is ordinarily needed, with sufficient pressure for fire engines.

The department has been very active in inspecting buildings where combustible and inflammable material was stored, and has obtained good results, although being compelled to bring several Chinese before the courts in order to obtain strict compliance with the provisions of the ordinance governing permits for storage of such material.

Casualties at fires during the year show two deaths—one of a child, through a can of gasoline becoming ignited, and an insane woman (native) being burned in a nipa house in Tondo. Several firemen were burned or injured in several ways, but none seriously.

At a fire in the Insular Ice Plant many of the men were overcome by fumes but returned again and again to the fight, and only after becoming unconscious and sent to the hospital or ordered by their officers would the brave fellows desist from attempts to check the fire. Fortunately none were permanently injured by these fumes.

ELECTRICAL DIVISION OF FIRE DEPARTMENT.

The City Electrician and his assistants have had a busy year and have obtained good results in maintaining and extending the Gamewell fire

and police telegraph system and endeavoring to put the old electric wires and installations on a safe basis, both exterior and interior.

The Gamewell system now consists of 83 fire-alarm boxes, 160 police-alarm boxes, 191 miles of wire, 428 city poles, and 185 foreign poles.

The utility of this system is beyond question, and only one accident occurred during the year of any account when box 54 failed to respond correctly on account of an accumulation of dust on a repeater. There were seven wire crosses caused by proximity of foreign circuits, but this condition is being rapidly ameliorated by raising the wire far above other circuits.

This division has inspected all electric installations in the city during the year and has compelled many changes to conform to the ordinances governing electrical installations. One thousand four hundred and fifty-three certificates of inspection and 1,623 permits for installation were issued.

Besides this work this department has been given direct charge of city lighting, both street and building, and also the installation of all wiring in city buildings and all other electrical work pertaining to the city, it having been found more economical and satisfactory to have such work done by the City Electrician and his force than by contract, except in cases of large contracts.

It is believed that arrangements will be completed before long for the Manila Telephone Company to use certain poles of the city for its lines, paying annual rent therefor and also accomplishing with one line of poles on a street that which formerly took two lines.

A new electrical ordinance has been drawn up covering the entire subject of electrical construction, interior and exterior, which has been carefully considered by the Board, the electrical companies, and others, but has not yet passed the third reading owing to the difference of opinion regarding the question of meter rates, but it is believed this question will be soon solved and the ordinance put in force. It will obtain for the city first-class electrical construction and operation in all respects.

EXPENSES FIRE DEPARTMENT.

The expenses of the department for the year are as follows:

Current expenses:

Salaries and wages	P181,354.95
Repairs to apparatus	614.22
Forage	17,799.05
Fuel	3,495.57
General supplies	10,259.42
Printing and binding	1,421.50
Total	<u>214,944.71</u>

Nonrecurring expenses :

Purchase of apparatus	₱31,339.00
Purchase of equipment	23,074.29
Purchase of equipment, for stations	4,517.21
Labor, extension fire and police alarm system	7,145.47
Material and supplies, fire and police alarm system	19,541.43
Total	<u>85,617.40</u>
Aggregate expenses	<u>300,562.11</u>

This statement shows an increase of ₱65,165.15 in current expenses over the year previous, and a decrease in nonrecurring expenses of ₱112,266.04 from the previous year, or a total decrease in expenses of ₱47,100.89. It is but natural, however, that in a department which is growing increased current expenses may be expected, and until the salary increase authorized by the Philippine Commission for length of service reaches the maximum and the department has reached a proper size this increase will continue. However, the department has about reached its proper size, and with a few additional pieces of apparatus and a fire boat for river-and-harbor work no other expenditures are contemplated.

Attention is invited to the report of the Chief of the department for the year which is annexed hereto and made a part of this report.

The Board regrets that Chief Bonner will shortly sever his connection with the department after two years' service, and extends to him gratitude and thanks for the efficient work performed both in organization and operation. He will leave behind a first-class fire department in every respect. His successor has not been determined upon, but it is hoped to obtain a worthy successor from the department.

DEPARTMENT OF ASSESSMENTS AND COLLECTIONS.

The results obtained in the work of the Department of Assessments and Collections during the past fiscal year were more satisfactory than in any previous year, in that a much larger amount of work was accomplished at a decreased expense. This was due mainly to a more permanent personnel and the increase in efficiency of the employees through experience, and also from a great improvement in the office accommodations of the department, a radical change having been made in the interior of the Assessor's office during the year, giving better facilities to the public and to the employees. Few complaints were received from the taxpayers, and none of serious import regarding delays or ill treatment. When it is understood how large a proportion of the population at one time or another has business with the tax collector, the record is astonishing.

The collections during the year from all sources in this department increased 32 per cent over the collections of the previous year, as follows:

Statement of collections fiscal year 1904 compared with collections fiscal year 1903.

Item.	Fiscal year 1904.	Fiscal year 1903.	Increase over 1903.	Decrease from 1903.
Land tax	P1,713,214.98	P1,168,292.84	P544,922.14	
Industrial tax	609,479.75	461,658.04	147,821.71	
Stamp sales	166,067.95	133,164.78	32,903.17	
Certificates of registration	91,426.37	104,177.58		P12,751.21
Matadero tax	175,645.34	140,491.28	35,154.06	
Market tax	285,875.47	218,048.94	67,826.53	
Licenses	357,366.89	329,640.90	27,725.99	
Live stock registration	1,108.77	1,013.42	95.35	
Vehicle tax	51,549.11	41,905.62	9,643.49	
Vehicle equipment	2,526.83	2,634.40		107.57
Municipal Court fines	151,971.31	125,383.74	26,587.57	
Justice-of-peace fees	4,825.60	3,798.78	1,026.82	
Sheriff's fees	11,489.99	7,133.78	4,356.21	
Rents	15,817.37	9,018.36	6,799.01	
Miscellaneous	5,303.65	4,632.78	670.87	
Certificates of installation	3,955.60	3,317.62	607.98	
Pound receipts	4,357.74	1,883.32	2,474.42	
Registration of cocheros	376.85	2,238.30		1,861.45
Public Health fees	15,619.67	8,130.66	7,489.01	
Secretary Municipal Board	67.50		67.50	
City Attorney's fees	34.22	219.08		184.86
Sales of city land	5,460.39		5,460.39	
Weights and measures	185.24		185.24	
Pail system	1,790.04		1,790.04	
Building permits	1,311.59		1,311.59	
Cleaning vaults	159.29		159.29	
Boiler inspection	456.00		456.00	
Total	3,677,443.51	2,766,814.22	925,534.38	14,905.09

Net increase over 1903, P910,629.29.

The general causes for this increase in collections may be briefly stated as follows:

First. The increase in the land tax due to the collection during this fiscal year of the full land tax for the calendar year 1903, at the rate of $1\frac{1}{2}$ per cent, and one-half of the tax for the calendar year 1904, at a rate of $1\frac{1}{2}$ per cent, plus the delinquent taxes for the years 1901 and 1902 with penalty and interest.

Second. The actual increase in the revenues due to the change in the currency, in which the revenues were paid, from local currency to Philippine currency by authority of Act No. 1032 of the Philippine Commission, which affected the industrial tax, stamp tax, market and matadero fees, business licenses, vehicle tax, and live-stock registration.

Third. The actual increases in the collections due to natural causes, in the Municipal Court fines, justice-of-peace fees, Sheriff's fees, market fees, matadero fees, rents, miscellaneous, certificates of electrical installation, pound receipts, and Public Health fees.

Fourth. New items of revenue, such as sales of city land, Secretary of Municipal Board fees, weights and measures, pail system, building permits, cleaning vaults, water rents, and boiler inspection, some of which were heretofore paid to the City Engineer.

The decreases in revenue in certain items may be explained as follows:

Certificates of Registration: Reduced number of delinquents from the year previous and apparent falling off in the number of taxpayers and

a larger delinquent list this year than the year previous, which will be paid the coming fiscal year.

Registration of cocheros has been abolished and the other items that show decreases were due to decreased business.

The cost of collection of revenue for the city was ₱168,314.18, an increase over the year previous of ₱3,825.20, although the ratio of expense to collections for the year appears as 4.5 per cent, while for the year previous it was 5.9 per cent.

Land taxes: The valuation for assessment of taxable real estate in the city of Manila for the year 1903, which was made by the Board of Tax Revision, shows a reduction from ₱84,000,000, as made by the Assessor's office, to ₱74,000,000 by the Board of Tax Revision. While this reduction caused the city quite a loss in land taxes for the year, yet the work of this Board was fairly satisfactory on the whole. Naturally some errors were made in relation to specific properties, and in such cases where the error has been apparent the Board by resolution has rectified same.

The total value of lands and improvements in the city of Manila for the year 1904 is \$59,904,381, while the taxable property under the provisions of the Land Tax Act is only \$37,407,768, or 62 per cent, while the exemptions amount to \$22,496,613, or about 38 per cent. These exemptions appear in about the following ratio to the total valuations:

	Per cent.
United States Government.....	6
Insular Government	11
City of Manila	5
Roman Catholic Church.....	5
Roman Catholic orders.....	8
Miscellaneous and undetermined.....	3
Total.....	38

This condition can hardly be considered an equitable one to the taxpayer and should be remedied by law. The Insular Government as an equivalent for its taxes and other considerations pays 30 per cent of the expenses of the city; the General Government as its share contributes in various ways to the benefit of the city through its Army and Navy, and no doubt the Catholic Church contributes in various ways by supporting charities and benevolent institutions at least a part equivalent of its taxes, but the Catholic orders alone appear to contribute to a very small extent to the support of the city government, holding as they do vast tracts of land and large edifices which by virtue of this law actually become a burden to the taxpayer. Either the law should be amended so that all but public lands and improvements should be taxed, as is the case in the State of California, where no doubt a similar condition once existed, or the exemption from taxation should be more clearly defined and permit a more equitable division of these taxes among the property owners.

Industrial taxes show a falling off in the number of taxpayers from 11,511 for the previous year to 11,406 for this year, but an increased collection from ₱461,658.04 in 1903 to ₱609,479.75 in 1904. This is due to the fact that the taxes for the last half of the fiscal year were payable in Philippine currency instead of local currency, the collection of some large delinquent taxes of the previous year, and the increased amounts paid by corporations upon their profits.

Stamp sales indicate an increase in the number of stamps sold, and on account of the change in currency a large increase in the amount of revenue from ₱133,164.78 to ₱166,067.95.

Certificates of registration show a decrease due to causes which the Assessor explains in detail in his report.

MARKETS AND MATADERO.

The Municipal Board has devoted special attention to the improvement of the condition of the markets and matadero, and is preparing, during the fiscal year of 1904-5, to open new markets in Galalangan and Pandacan and to replace the Sampaloc Market with another in a better situation close to an estero and with a building having conditions analogous to those of the addition to the Arranque Market. Excessive crowding of the existing markets shown by the constant increase of the revenue which they produce justifies the providing of these new markets for the outlying districts; moreover, the Divisoria Market, which is the best situated, will be the object of very important reforms in the way of improvements and in the administrative rules for the collection of fees and for the establishment of venders' stalls.

Such reforms have been recommended insistently by the Advisory Board, which considers it a duty of the city to elevate the habits of the people in their transactions in the markets, so that operations conducted therein may be similar to those of the best markets in Europe and America.

The following statements show the importance of each market and of the matadero, and the net proceeds of each available for the general expenses of the city:

Market proceeds during the fiscal year 1904.

Name of market.	Receipts.	Expenses of collection.	Outlay for improvements.	Net revenue.
Divisoria	₱145,765.06	₱8,611.92	₱9,163.48	₱127,989.60
Quinta	66,520.21	4,047.92	5,812.61	56,659.68
Arranque	31,834.85	2,776.41	8,427.41	20,631.03
Herran	10,006.73	798.75	2,175.35	7,032.63
Anda	3,833.64	829.77	2,018.04	985.83
Sampaloc	7,484.67	457.43	2,326.10	4,701.14
Santa Ana	1,610.08	369.26	-----	1,240.82
Tetuan	4,726.59	433.20	-----	4,293.39
Bahia	6,367.34	1,334.00	-----	5,033.34
Esteros	7,594.96	494.50	-----	7,100.46
Total	285,744.13	20,153.16	29,922.99	235,667.98
Matadero	175,645.34	9,612.79	9,724.23	156,308.32

In order to render this table complete we have added the following statement, which shows the slow but steady advancement of the markets in the public estimation, and demonstrates that notwithstanding the decrease in the population of the city the sale of foodstuffs is increasing:

Comparative statement of the revenues derived from the markets and the matadero for the two years under the same tariff.

Name of market.	Net revenue, 1903.	Net revenue, 1904.	Increase for the year 1904.
Divisoria	P98,969.71	P127,989.60	P29,019.89
Quinta	42,005.51	56,659.68	14,654.17
Arranque	15,373.84	20,631.03	5,257.19
Herran	5,114.44	7,032.63	1,918.19
Anda	115.10	985.83	870.73
Sampaloc	3,807.55	4,701.14	893.59
Santa Ana	934.11	1,240.82	306.71
Tetian	2,675.05	4,293.39	1,618.34
Bahia	4,089.86	5,033.34	943.48
Esteros	4,728.15	7,100.46	2,372.31
Total	177,813.32	235,667.98	57,854.66
Matadero	119,242.30	156,308.32	37,066.02

LICENSES.

The amount collected for licenses during the year (P357,366.89) exceeds the collections of the previous year (P329,640.90) by P27,725.99, due to an increase in the number of ordinary business licenses issued, caused by increased activity of the Police Department in apprehending unlicensed persons engaged in business.

Native-wine licenses show an increase from 1,168 to 1,360, or 192 during the year, this increase being caused by authorization of a large number of native-wine licenses, it having been found that such licenses do not materially affect the order of the community and do not result in abuses.

The licenses for saloons and other places where liquor is sold for consumption on the premises have been decreased from 177 to 142, a decrease of 35, and the licenses where liquor is sold to be consumed elsewhere than on premises has been reduced from 166 to 123, a reduction in the number of such licenses by 43. The reductions in the saloon and grocery liquor-license business is due no doubt to the general business depression, and it is believed a still further reduction will be made during the coming year in this class of licenses.

The public-vehicle licenses indicate a slight falling off during the year, the total receipts for the year being P15,332.60, as against P17,423 for the previous year.

Dog licenses show an increase of P519.67 over the year previous, and bicycle licenses a reduction of P716.88 from the year previous. Other classes of licenses, such as entertainment licenses and peddlers' licenses, show an increase in the number issued and the amount collected over the previous year.

The live-stock registration and sale of vehicle equipment for public vehicles produced about the same revenue as of the year previous, notwithstanding the currency change, and thus shows a net falling off in the amount of business.

Vehicle taxes show an increase from ₱41,905.62 to ₱51,549.11, due to the currency change and increased activity of the department in enforcing the collection of this tax, which is a very difficult matter on account of the nature of the tax, it being an annual tax upon each vehicle in use, payable quarterly. The Assessor and Collector has made certain recommendations regarding an amendment to this vehicle-tax law, and it is the intention of the Board to either repeal or amend this law when the effect of the new internal-revenue law upon the revenue of the city has been ascertained. It is the opinion of the Board that the opening of the new street railway will greatly reduce the amount of revenue from this tax by reducing the number of vehicles which now amounts to 6,853, utilizing 9,293 draft animals with the probability that at least 10 per cent of the actual number have escaped taxation.

Municipal Court fines, justice-of-the-peace fees, and Sheriff's fees show material increases in the amount collected during the past year over the year previous, due to increased business, but it is not yet considered that these sources of revenue have reached the maximum and probably will be still further increased during the year to come.

Rents show an increase of ₱6,799.01 over the year previous, which is due to advances on some of the leases which have been renewed during the year. The city does not yet obtain adequate rents for a great deal of the property leased, but it is believed that during the coming fiscal year largely increased rentals will be received.

Miscellaneous collections show a slight increase over the year previous, and will probably be still further increased in the year to come.

Certificates of electrical installation and pound receipts also show increased revenues on account of increased business.

Public Health fees, which in reality are fees for burial permits and niches and graves in public cemeteries, show a material increase of ₱7,489.01. During the coming year the opening of the new cemetery will probably still further increase this item.

The other items shown on the statement are not so susceptible to comparison with the year previous in the collections of the City Assessor and Collector, as heretofore they have been paid through other departments, where the comparisons will be made.

In addition to the collections of previous years the City Assessor and Collector was by Act No. 1141 of the Philippine Commission, effective June 1, 1904, charged with the collection of water rents, fees for cleaning vaults, use of pail system, building permits, sealing weights and measures, and charges heretofore collected by the Department of

Engineering and Public Works, thus relieving this department from the necessity of handling funds. It is the intention of the Municipal Board to have all payments due to the city paid to the City Assessor and Collector wherever practicable, and the change in the payment of items enumerated above has been successful not only in affording better facilities to the public to pay all their dues at one office but also to decrease the cost of collection.

The personnel of the department has not materially changed during the year, consisting of Mr. A. W. Hastings, City Assessor and Collector; Mr. Ellis Cromwell, chief deputy collector, and Mr. Henry Steere, chief deputy assessor, with practically the same number of employees—26 Americans and 129 Filipinos. Inasmuch as the assessment of real estate for the city by the Board of Tax Revision will stand for the next three years, the Board considers it advisable to abolish the office of chief deputy assessor, combining a portion of his duties with those of the chief deputy collector and distributing the balance among the other employees of the department, thus permitting a saving of ₱6,000 a year, at least until such time as an assessor is necessary, and then it is believed that the work can be done by the City Assessor and Collector and his chief deputy.

CITY SCHOOLS.

The unsatisfactory enrollment and attendance condition indicated in former reports has been considerably improved. The following table indicates actual conditions:

Month.	Day schools.			Night schools.		
	Enroll- ment.	Attend- ance.	Percent- age.	Enroll- ment.	Attend- ance.	Percent- age.
June, 1902 -----	2,244	1,992	84	1,556	1,254	87
June, 1903 -----	3,046	2,341	92	2,626	2,107	87
June, 1904 -----	5,767	4,602	92	5,043	4,074	83

New buildings have been secured for the following schools: Intramuros Boys' and Girls', No. 172 Victoria, Intramuros; Santa Cruz Boys', 608 Bilibid; Quiapo Boys', 63 Noria; Paco Girls', 365 Real; Tondo Secondary, 569 Lemery; Kindergarten, 110 Dulumbayan; Kindergarten, 87 Padre Rada, Tondo.

The sum of \$100,000, United States currency, was appropriated for the commencement of the construction of three schoolhouses to have a relative capacity of 2,000 pupils, and to be located, one in Tondo, one in Trozo, and one in Ermita. A statement of the preliminary proceedings relative to the construction of these buildings will be found in that portion of those reports which treat of public works. The cost of these three schoolhouses is estimated at \$200,000, United States currency,

proportioned as follows: Tondo School, \$100,000; Trozo School, \$60,000; Ermita School, \$40,000.

Respectfully submitted.

A. CRUZ HERRERA, *President.*

CHARLES H. SLEEPER, *Member.*

P. G. McDONNELL, *Member.*

MIGUEL VELASCO, *Member.*

S. B. PATTERSON, *Member.*

THE CIVIL GOVERNOR OF THE PHILIPPINE ISLANDS.

REPORT OF THE SECRETARY.

MANILA, P. I., *July 1, 1904.*

SIRS: Complying with your directions, I have the honor to submit my report as Secretary of the Municipal Board for the fiscal year ended June 30, 1904.

With the growth of the city and the many municipal improvements being made, the work of the Board has increased materially during the year, and as a consequence the regular duties devolving upon this office (directing as it does, upon the instructions of the Board, the work of all the city departments) have likewise increased, and other special duties have from time to time been assigned to it. Among these added or special duties the most important perhaps is that of sending the indigent sick to the hospitals for treatment. The old arrangement with the San Juan de Dios Hospital to care for the indigent sick, under which the city maintained 100 beds, having been found unsatisfactory, there being times when all the beds thus maintained were not occupied, and it being impossible to keep any accurate check or record of these cases, and there being other disadvantages, a new, and, as has been proven, a more satisfactory, contract was made with the same institution on August 15. Under the provisions of this new contract the city pays 70 cents, gold, for each patient sent there on its account, this amount paying for food, medicine, care, and professional treatment. No one is admitted as a city charge without an order from this office, and to avoid impositions as far as possible each applicant for a card of admission must be vouched for by the member of the Advisory Board representing the district in which he lives. Victims of accidents and other urgent cases are received by the hospital on provisional orders issued by the drivers of the ambulances conveying such patients there, and these provisional orders are afterwards substituted by the regular tickets from this office.

The following is a report in detail of the patients admitted and the cost to the city for their care and treatment:

Statement of patients admitted to and remaining in San Juan de Dios Hospital.

Nationality.	Admitted.	Cured and discharged.	Deaths.	Remaining.
Americans -----	91	78	6	7
Europeans -----	30	25		5
Filipinos -----	814	594	133	87
Chinese and other Asiatics -----	43	36	4	3
Total -----	978	733	143	102

Cost to the city, by months.

September, 1903	\$2,054.50
October, 1903	1,971.20
November, 1903	1,971.20
December, 1903	1,444.50
January, 1904	2,205.70
February, 1904	1,926.40
March, 1904	2,045.40
April, 1904	2,025.80
May, 1904	2,177.70
June, 1904	2,158.10
Total	19,980.50

Date of execution of contract, August 15, 1903.

Pursuant to Act No. 608 of the Philippine Commission, the Treasurer of the Philippine Islands on October 20 transferred to this office, as pertaining to the "Carriedo bequest," seventy-seven bonds of the Spanish-Filipino government, having a par value of 7,700 pesos, Spanish-Filipino currency, and 94 shares of stock of the Banco Español-Filipino, having a par value of 18,800 pesos, Spanish-Filipino currency. It was thought advisable by the Board to dispose of the bonds, the Spanish Government having discontinued the payment of the coupons. They were, therefore, after due advertisement, sold to the highest bidder, the price received being \$3,311, gold. By your direction that amount was deposited with the Treasurer of the Philippine Islands to the credit of the city general fund. The bank shares, ninety-four in number, are still in my custody.

The receipts of this office, derived solely from the certification of municipal records to the public, and the sale of condemned office furniture, amount to 419 pesos, Philippine currency.

During the year just ended the Board held 303 sessions, and considered and acted upon 2,901 items of municipal business, of which, either because they were of a character which legally required it or because the Municipal Board felt itself in need of the advice of its Filipino colleagues before taking final action, 70 were referred to the Advisory Board for its recommendations. In addition to these, 101 items, mainly recommendations and complaints from the Filipino population, were brought to the attention of the Municipal Board by the Advisory Board.

The following ordinances were passed, after due reference to the Advisory Board, as required by law, and then published in English, Spanish, and Tagalog:

Ordinances passed by the Municipal Board during fiscal year 1903-4.

No. of ordinance.	Subject-matter.	Date of passage.
51	Relating to the use of public streets and places of Manila	July 27, 1903
52	Granting a license to the Eastern Extension Australasia and China Telegraph Company, Limited, and the Commercial Pacific Cable Company to lay an underground cable	July 29, 1903
53	Relating to the construction and repair of buildings	Aug. 7, 1903
54	Amending Ordinances Nos. 8 and 18, relating to Board of Health fees	Aug. 10, 1903
55	Regulating the use of public vehicles	Aug. 17, 1903
56	Relating to the collection and disposal of garbage and rubbish	Aug. 29, 1903
57	Relating to Board of Health fees	Sept. 19, 1903
58	Regulating the use of iron, steel, and metal shutters, blinds, and doors	Oct. 10, 1903
59	Relating to the registration and disposal of the dead	Nov. 9, 1903
60	Relating to cleaning of water-closets and cesspools, and removal of putrid and offensive materials	Nov. 20, 1903
61	Providing regulations for the government of the Carriedo water supply of the city of Manila	Nov. 25, 1903
62	Relating to cleaning of water-closets and cesspools, and removal of putrid and offensive materials	Dec. 11, 1903
63	Regulating the ringing of bells, the blowing of whistles, and the making of loud or unusual noises	Dec. 17, 1903
64	Providing for the posting in business places of notices announcing the kind of money in which prices are fixed, and rate of exchange	Feb. 5, 1904
65	Relating to pawnbrokers	Feb. 17, 1904
66	Regulating the collection and disposal of dead animals in the city of Manila	Apr. 25, 1904
67	Amending ordinance regulating the collection and disposal of dead animals	June 24, 1904

Number of ordinances passed, 17.

The following is a list of ordinances introduced and discussed, but upon which final action has not been taken :

Relating to the establishment of a fish market at Bancusay; relating to the manufacture and sale of aerated water; electrical ordinance; relating to fire walls in theaters; relating to plumbing; relating to ferries.

The following are lists of contracts entered into, lands purchased, and for what purpose, and lands sold by the Board :

Contracts entered into.

Contractor.	Object.	Amount.
San Juan de Dios Hospital	Treatment and care of indigent sick	
B. W. Cadwallader & Co	Completion of new city hall	\$53,848
H. M. Jones	Tanduay fire station	27,400
D. W. Smith	Veterinary hospital at Palomar	5,447
O. F. Campbell	Shop at arroceros	4,945
Salvador Farré	River wall	
S. C. Choy	Tables for Arraque Market	970
D. W. Smith	Concrete floor in Arraque Market	2,765
Mariano Villanueva	Filling at Malacañan	14,320
D. H. Ward	Driving piles at Ayala Bridge	1,156
D. W. Smith	Shed for road roller	939
S. C. Choy	Painting internal-revenue building	11,850
Do	Police station at Santa Cruz	25,400
H. A. Belden	Paving Escolta, Rosario, etc	26
Salvador Farré	Riprap at Malacañan	
Do	Wall at Arroceros shops (river wall)	8,775
Earnshaw & Co.	Repairs to barge <i>Pluto</i>	1,200
Mariano Villanueva	Cutting grass in moat	200
Tan Sanco	Side entrance to city hall	1,395
Do	Awnings, second and third stories of city hall	16,088
S. D. Martinez	Awnings, first story city hall	505
Ramon Pazos	Broken stone	3,480
Manila Electric Railway and Light Company.	Settlement of differences in repaving	

¹ Philippine currency.

² Per meter.

Contracts entered into—Continued.

Contractor.	Object.	Amount.
Feliciano Quiogue.....	Burial of pauper dead.....	\$4,6,8
B. W. Cadwallader.....	Temporary fire station in Tondo.....	13,745
Tomás Reyes.....	Transportation of meats from matadero to markets.....	
J. W. Winkelbach.....	Painting Intramuros school building.....	13,190
R. V. Dell.....	Planting trees in Cementerio del Norte.....	1,250
Lack & Davis.....	Filling K Street.....	3,000

¹ Philippine currency.*Land purchased by city.*

From whom purchased.	Object and location.	Price.
Nemesio Delfin Santiago.....	165 meters on Calle Bilibid to settle question of title.....	\$130.44
Antonio Lecaros.....	1,098.75 meters for widening Calle Quiotan.....	155.22
Arnold Dittmar.....	18,949 meters for widening Aviles.....	651.73
Tuason Heirs.....	500,000 meters for new cemetery.....	20,000.00
José Alemany.....	107.63 meters for widening Herran.....	
Ignacio Herrera.....	53,005 meters for widening Sacristia.....	2,500.00
Rosales & Newberry.....	10,332 meters for new streets.....	
Valeriano Valdesco.....	10,641.47 meters for widening San Marcelino.....	515.07
Gregorio Araneta.....	682.05 meters for new street from E Street, Ermita.....	12,729.80

¹ Philippine currency.*Land sold by city.*

To whom sold.	Location.	Price.
Rafael Reyes and Abelardo La Fuente.....	744.5 meters, old estero in Quiapo.....	P3,098.00
Mariano Corrales.....	Calle Tabora.....	(1)
Edward Cook.....	81.3 meters on Calle Peña-Francia, Paco.....	250.00
Fernando Zamora.....	7.38 meters on Calle Iris.....	29.50
Valeriano Alfonso, and others.....	Alley near Arranque.....	

¹ Exchange.² United States currency.

More than 6,000 communications were received by this office during the year, and the rule of answering each one, however unimportant it appeared, and generally in the language in which it was written, has been continued.

The Secretary is authorized by law to administer oaths in all matters pertaining to the city, and has administered about 500 to city employees, no charge having been made.

The work of this office has been conducted by 6 American clerks, 1 Spanish interpreter, 3 Filipino clerks, and 3 Filipino messengers. Two Americans and two Filipinos are almost constantly engaged on the committee work of the various members of the Board, and are detailed for that purpose to the respective offices of these members. One Filipino spends his entire time in classifying and filing the old records of the Spanish municipal government, which tedious work is progressing satisfactorily. New and more direct and accurate systems for the conduct of this office have been inaugurated from time to time, whenever it was thought wise, and it is gratifying to report that in spite of the increase

in the amount and the importance of the work, it has been conducted with less expense to the city than ever before, and, it is believed, with greater promptness and efficiency.

Respectfully submitted.

JOHN M. TUTHER, *Secretary.*

The MUNICIPAL BOARD, *Manila, P. I.*

REPORT OF THE DISBURSING OFFICER.

OFFICE OF THE CITY DISBURSING OFFICER,
Manila, P. I., August 31, 1904.

GENTLEMEN: In compliance with the provisions of the City Charter, I have the honor to submit herewith my report of the business of this office for the fiscal year ended June 30, 1904.

Very respectfully,

R. C. BALDWIN,
Disbursing Officer Municipal Board.

The MUNICIPAL BOARD OF MANILA.

Statement showing detailed expenditure of funds for the fiscal year 1904 and unexpended balances of appropriations for the city of Manila.

MUNICIPAL BOARD.

By appropriations, Acts Nos. 804, 1011, and 1048 ----- ₱98,902.00

To disbursements for salaries and wages:

Members of the Municipal Board -----	38,150.00
Secretary's office -----	26,159.23
Disbursing office -----	14,626.64
Advisory Board -----	9,080.06
Board of Tax Revision -----	8,326.00
Unexpended balance -----	2,560.07
Total -----	98,902.00

By appropriations, Acts Nos. 804, 1011, 1048, and 1213 ----- 127,208.58

To disbursements for contingent expenses:

Office supplies, stationery, etc -----	3,382.27
Advertising -----	1,847.30
Official transportation -----	48.30
Support of civil prisoners in Bilibid -----	67,178.80
Care of paupers in hospitals -----	40,423.60
Music for evening concerts on Luneta -----	6,400.00
Expenses, Board of Tax Revision -----	2,029.26
Settlement, claim of Salvador Farre -----	1,511.80
Printing and binding -----	4,175.70
Unexpended balance -----	211.55
Total -----	127,208.58

Synopsis of expenditures:

Total for salaries and wages -----	96,341.93
Total for contingent expenses -----	126,997.03
Grand total -----	223,338.96

Statement showing detailed expenditure of funds, etc.—Continued.

LAW DEPARTMENT.

By appropriations, Acts Nos. 804, 1011, 1048, 1146, and 1213	<u><u>P133,315.56</u></u>
To disbursements for salaries and wages:	
Office of City Attorney	30,481.00
Office of Prosecuting Attorney	43,108.03
Office of Sheriff of Manila	24,775.23
Municipal Court	18,381.40
Office of Register of Deeds	8,585.10
Justice-of-peace courts	5,503.18
Unexpended balance	2,481.62
Total	<u><u>133,315.56</u></u>
By appropriations, Acts Nos. 804, 1048, and 1213	<u><u>15,920.00</u></u>
To disbursements for contingent expenses:	
Stationery and office supplies	7,954.80
Special interpreters' fees	1,131.00
Court costs and fees	2,389.56
Official transportation	30.50
Expenses of indigent witnesses	163.20
Printing and binding	4,049.70
Unexpended balance	201.24
Total	<u><u>15,920.00</u></u>
Synopsis of expenditures:	
Total, salaries and wages	130,833.94
Total, contingent expenses	15,718.76
Grand total	<u><u>146,552.70</u></u>

FIRE DEPARTMENT.

By appropriations, Acts Nos. 804, 1048, 1167, and 1213	<u><u>186,462.97</u></u>
To disbursements:	
Salaries and wages	180,322.34
Unexpended balance	5,140.63
Total	<u><u>185,462.97</u></u>
By appropriations, Acts Nos. 804, 1048, and 1167	<u><u>121,999.43</u></u>
To disbursements for equipment:	
Purchase, apparatus, horses, etc	62,699.02
Maintenance and repair, equipment	1,079.39
Extension of police-alarm system	22,555.56
Painting fire-alarm poles	284.70
Unexpended balance	35,380.76
Total	<u><u>121,999.43</u></u>
By appropriations, Acts Nos. 804, 1048, and 1213	<u><u>36,042.00</u></u>

Statement showing detailed expenditure of funds, etc.—Continued.

FIRE DEPARTMENT—continued.

To disbursements for contingent expenses:	
Office supplies, furniture, etc	P1,434.83
Forage	16,842.56
Incidental expenses	12,408.51
Printing and binding	1,199.20
Unexpended balance	4,156.90
Total	36,042.00
Synopsis of expenditures:	
Salaries and wages	180,322.34
Equipment	86,618.67
Contingent expenses	31,885.10
Grand total	298,826.11
DEPARTMENT OF ASSESSMENTS AND COLLECTIONS.	
By appropriations, Acts Nos. 804, 1011, 1048, 1167, and 1213	148,394.20
To disbursements for salaries and wages:	
Office force, markets, and matadero	148,116.65
Unexpended balance	277.55
Total	148,394.20
By appropriations, Acts Nos. 804, 1011, and 1048	17,870.00
To disbursements for contingent expenses:	
Office supplies and advertising	7,850.52
Official emergency transportation	1,310.27
Printing and binding	6,962.60
Unexpended balance	1,746.61
Total	17,870.00
By appropriations, Acts Nos. 804 and 847	3,545.00
To disbursements:	
Tax refunds, fiscal year 1903	3,482.45
Unexpended balance	62.55
Total	3,545.00
By appropriations, Acts Nos. 1011 and 1048	3,793.24
To disbursements:	
Tax refunds, fiscal year 1904	1,040.35
Unexpended balance	2,752.89
Total	3,793.24
Synopsis of expenditures:	
Salaries and wages	148,116.65
Contingent expenses	16,123.39
Tax refunds	4,522.80
Grand total	168,762.84

Statement showing detailed expenditure of funds, etc.—Continued.

DEPARTMENT OF CITY SCHOOLS.

By appropriations, Acts Nos. 804, 1011, and 1048	<u>P284,468.00</u>
To disbursements for salaries and wages:	
Office force	5,259.86
Night school teachers	123,805.00
Filipino teachers	144,887.29
Unexpended balance	10,515.85
Total	<u>284,468.00</u>
By appropriations, Acts Nos. 804, 1011, and 1048	<u>6,532.40</u>
To disbursements for contingent expenses:	
Office supplies, stationery, etc.	4,381.96
Printing and binding	1,095.70
Unexpended balance	1,054.74
Total	<u>6,532.40</u>
Synopsis of expenditures:	
Salaries and wages	273,952.15
Contingent expenses	5,477.66
Grand total	<u>279,429.81</u>

POLICE DEPARTMENT.

By appropriations, Acts Nos. 804, 1048, and 1167	<u>1,120,593.65</u>
To disbursements for salaries and wages:	
Office force	39,492.29
Police officers	64,405.18
First-class police (Americans)	690,378.27
Second and third class police (Filipinos)	254,938.04
Detective Bureau	47,767.28
Police fund	1,028.00
Emergency police	1,197.08
Unexpended balance	21,387.51
Total	<u>1,120,593.65</u>
By appropriations, Acts Nos. 804, 1048, 1167, and 1213	<u>61,272.54</u>
To disbursements for equipment:	
Equipment of force	3,825.67
Purchase of revolvers	21,457.70
Police-alarm system	36,274.37
To balance	285.21
Total	<u>61,557.74</u>
By appropriations, Acts Nos. 804, 1048, and 1167	<u>48,277.72</u>

Statement showing detailed expenditure of funds, etc.—Continued.

POLICE DEPARTMENT—continued.

To disbursements for contingent expenses:	
Office supplies, advertising	P15, 184. 12
Subsistence, prisoners in police stations	6, 437. 19
Repairs to police launches	2, 770. 86
Coal and forage	9, 604. 12
Official transportation	8, 866. 06
Printing and binding	3, 852. 30
Unexpended balance	1, 563. 07
Total	48, 277. 72
By appropriations, Acts Nos. 804 and 1048	3, 000. 00
To disbursements:	
Secret service	1, 363. 22
Unexpended balance	1, 636. 78
Total	3, 000. 00
Synopsis of expenditures:	
Salaries and wages	1, 099, 206. 14
Equipment	61, 557. 74
Contingent expenses	46, 714. 65
Secret-service fund	1, 363. 22
Grand total	1, 208, 841. 75

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS.

By appropriations, Acts. Nos. 804, 1011, 1048, and 1167	937, 450. 00
To disbursements for salaries and wages:	
Salaries—	
Office force, City Engineer	37, 854. 61
Department of Water Supply	46, 532. 99
Department of Street Cleaning and Disposal of City Refuse	38, 335. 90
Department of Street Construction and Bridges	35, 324. 44
Department of Buildings and Illumination	20, 098. 84
Department of Building Inspection	8, 962. 24
Department of Boiler Inspection	890. 00
Department of Drafting and Surveys	15, 579. 49
City shops	23, 608. 29
Temporary building inspectors	3, 000. 18
Survey of new water system	19, 710. 46
Survey of new sewer system	10, 057. 74
Transportation corrals	92, 959. 92
Division of weights and measures	3, 600. 00
Division of parks	2, 290. 00
Division of cemeteries	1, 970. 00
M. A. Mont, claim for accrued leave	400. 00
Ordinary labor—	
Department of Street Cleaning and Disposal of City Refuse	186, 267. 46
Department of Street Construction and Bridges	126, 221. 70
Department of Water Supply	33, 241. 69

Statement showing detailed expenditure of funds, etc.—Continued.

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS—continued.

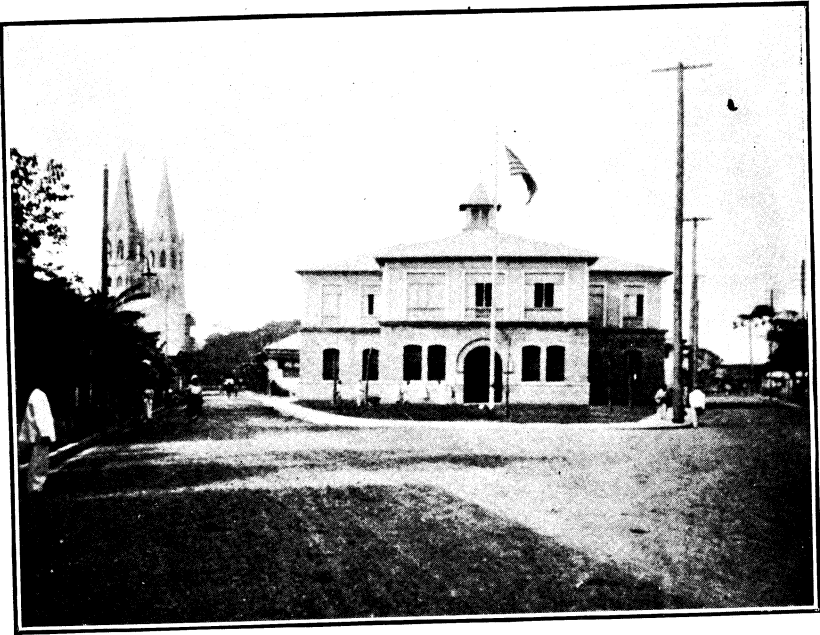
To disbursements for salaries and wages—Continued.

Ordinary labor—Continued.

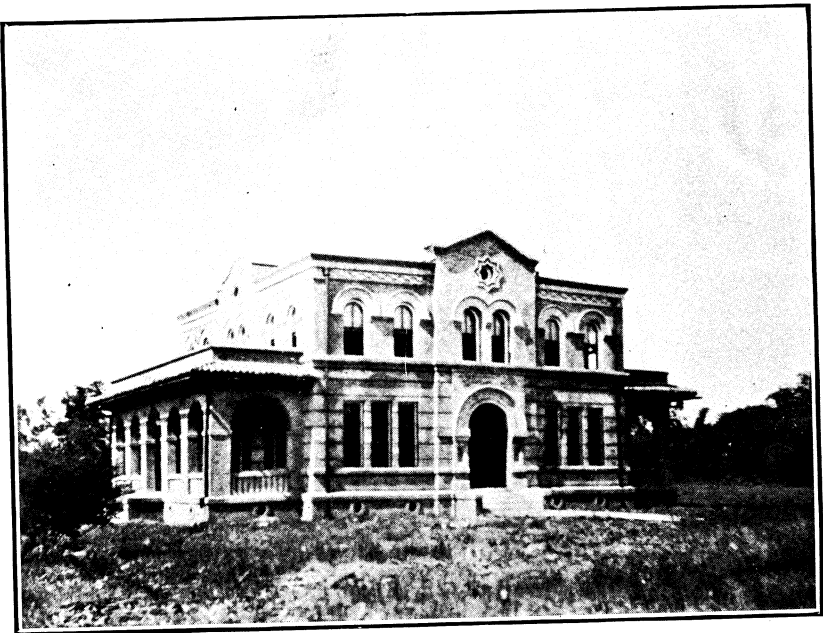
Department of Buildings and Illumination	P 35,752.50
Completing survey work	6,682.53
City shops	13,110.69
Transportation corrals	49,634.66
Division of parks	18,525.75
Division of cemeteries	14,809.70
City rock quarry	32,325.50
Miscellaneous	28,381.45
Salaries and labor, sewers	6,451.39
Unexpended balance	24,869.88
Total	937,450.00
By appropriations, Acts Nos. 804, 1011, and 1048	990,420.00
By appropriation, Act No. 1048, for purchase of pail system from Board of Health	400,000.00
By transfer from Insular Board of Health of unexpended balance of funds appropriated for support of pail system	118,404.13
Total	1,508,824.13

To disbursements for public works (maintenance and repair):

Repairs to city bridges	62,796.12
Purchase, transportation, road materials	128,392.18
Supplies, repairs to barges and launches	35,968.48
Coal for crematories	15,411.32
Coal and oil for rock quarry	4,378.60
Forage	75,141.64
Repairs to stables and corrals	9,466.58
Tools, hose, and miscellaneous supplies	36,262.78
Repairs, harness, carts, and wagons	25,086.76
Horseshoeing materials	2,860.87
Maintenance, public grounds and parks	11,149.07
Development of city rock quarry	17,747.74
Repairs, markets and municipal buildings	60,355.07
Supplies for cleaning public buildings	2,223.46
Repairs to dredger	258.64
Electric lighting, streets and parks	94,267.54
Materials, extension of electric service	4,345.76
Oil for lighting public buildings	2,668.94
Repairs to garbage crematories	2,923.72
Purchase of horses, mules, harness, and hire of bull carts	72,803.55
Medicines and veterinary supplies	1,031.65
Supplies for cemeteries	13.20
Construction of river wall, city shops	3,596.01
Installation of machinery, city shops	9,507.37
Construction of rock-carrying scows	19,065.51
Purchasing street paving blocks	41,485.57
Purchase and location of new sewer pipe	12,347.09
Purchase and location of fire hydrants	22,462.83



TANDUARY FIRE STATION.
(Cost P54,761.30 completed.)



TONDO POLICE STATION.
(Cost P26,670.)

Statement showing detailed expenditure of funds, etc.—Continued.

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS—continued.

To disbursements for public works, etc.—Continued.

Location of new water mains	P 32,670.54
Repairs to water system	14,485.84
Repairs to Santolan Road	8,643.78
Repairs, pumping station machinery	3,085.71
Cleaning reservoirs at the Deposito	3,045.15
Transportation of water-supply materials	1,472.75
Purchase and installation of scales and track at the matadero ...	1,490.15
Coal, pumping station, water-supply shops	34,342.68
Miscellaneous repairs and machinery supplies for Water Supply Department	19,004.91
New water pipe and fittings for extension and repairs to water system	85,120.00
Improving grounds at city shops	7,476.66
Purchase of means of transportation	14,224.00
Repairing and cleaning, old sewers	4,315.71
Cleaning esteros	1,969.70
Purchase of pails for pail system	39,479.00
Purchase of commodores for pail system	382.50
Purchase, pail system from Insular Government	384,664.10
Support of pail system prior to Jan. 1, 1904	35,540.70
To return to Insular revenues of excess appropriation for pur- chase of pail system	15,335.90
Unexpended balance	28,056.30
Total	<u>1,508,824.13</u>

By appropriations, Acts Nos. 804, 1011, and 1048

107,900.00

To disbursements for contingent expenses:

Office furniture, supplies, stationery	6,027.52
Public telephone service	2,626.80
Supplies for city survey work	3,516.06
Renumbering of houses	315.04
Burial of paupers	11,268.00
Hire of official transportation	11,168.34
Printing and binding	3,894.20
Miscellaneous supplies for pail system	770.25
Rent of—	
Police stations	12,390.65
Schoolhouses	39,632.73
Market sites and tool sheds	10,794.86
Unexpended balance	5,495.55
Total	<u>107,900.00</u>

Synopsis of expenditures:

Salaries and wages	912,580.12
Public works	1,465,431.93
Contingent expenses	101,404.45
Grand total	<u>2,479,416.50</u>

Statement showing detailed expenditure of funds, etc.—Continued.

PUBLIC WORKS (PERMANENT IMPROVEMENTS).

By appropriations, Acts Nos. 830 and 1087	P883,316.00
To disbursements for public improvements:	
Construction of—	
Machinery building, arroceros shops	10,534.00
Shelter for steam road roller	1,878.00
Fire station in Tanduary	54,761.30
Police station in Tondo	9,450.00
Veterinary hospital, Palomar Island	10,829.83
New city hall	93,957.18
Purchase of paving blocks for Calles Echague, Rosario, and Escolta	2,612.82
Purchase of ground site for cemetery at La Loma	40,000.00
Improvement of new La Loma Cemetery	9,986.60
Extension and improvement of water-supply system	50,000.00
Extension, widening and general improving of streets—	
Streets in San Lazaro estate	7,836.00
Calle Morines, Tondo	11,936.33
San Marcelino	9,627.44
Calle Victoria	15,000.00
Calle Palacio	4,442.95
Calle Sacristia	18,586.48
Streets in Ermita and Malate	15,243.31
Calles Bilibid and Limasana	571.32
Completion of H Street, Ermita	11,309.09
Unexpended balance	504,753.35
Total	883,316.00

Recapitulation of expenditures for fiscal year 1904.

Department.	Salaries and wages.	Contingent expenses.	Public works.
Municipal Board	P96,341.93	P126,997.03	-----
Law Department	130,833.94	15,718.76	-----
Fire Department	180,322.34	31,885.10	-----
Assessments and Collections	148,116.65	16,123.39	-----
Department of City Schools	273,952.15	5,477.66	-----
Police Department	1,099,206.14	48,077.87	-----
Engineering and Public Works	912,580.12	102,404.45	P1,465,431.93
Public Works, city of Manila	-----	-----	378,562.65
Total	2,841,353.27	346,684.26	1,843,994.58

Department.	Equipment.	Tax refunds.	Aggregat.
Municipal Board	-----	-----	P223,338.96
Law Department	-----	-----	146,552.70
Fire Department	P86,618.67	-----	298,826.11
Assessments and Collections	-----	P4,522.80	168,762.84
Department of City Schools	-----	-----	279,429.81
Police Department	61,557.74	-----	1,208,841.75
Engineering and Public Works	-----	-----	2,480,416.50
Public Works, city of Manila	-----	-----	378,562.65
Total	148,176.41	4,522.80	5,18,731.32

Disbursements made by city disbursing officer	P3,785,177.32
Supplies purchased from Insular Purchasing Agent	1,272,321.82
Ten per cent of cost of supplies paid to the Insular Purchasing Agent as provided in Act No. 231	127,232.18
Total	5,184,731.32

Statement of expenditures during the fiscal year 1904 from appropriations for the fiscal year 1903.

Municipal Board:	
Salaries, Secretary's office	P140.00
Contingent expenses, Board of Tax Revision	3.06
Purchase of partially complete Cosmopolitan Hospital Building, now used as city hall	29,649.06
Cost of repairing and strengthening the partially constructed build- ing purchased from defunct Cosmopolitan Hospital Association ..	12,900.00
Services of electrical expert	425.00
Office supplies and advertising	11.64
Printing and binding	27,001.04
Total	70,129.80
Law Department:	
Salaries and wages	148.32
Office supplies, advertising, etc	6.40
Total	154.72
Fire Department:	
General supplies	19.70
Assessments and Collections:	
Salaries regular force	475.52
Police Department:	
Salaries first-class policemen	275.00
General supplies and repairs	2,088.38
Total	2,363.38
Engineering and Public Works:	
Salaries and wages	51.34
Purchase of paving blocks	6,497.62
Maintenance of electrical service	81.02
Arranque Market	24,208.00
Burial of pauper dead	4,000.00
Rent of school buildings	60.00
Total	34,897.98
Grand total	108,041.10

Recapitulation of all expenditures made from appropriations for the city of Manila during the period of July 1, 1903, to June 30, 1904.

Department.	Fiscal year 1903.	Fiscal year 1904.	Total.
Municipal Board	P70,129.80	P223,338.96	P293,468.76
Law Department	154.72	146,552.70	146,707.42
Fire Department	19.70	2,882.11	298,845.81
Department of Assessments and Collections	475.52	168,762.84	169,238.36
Department of City Schools		279,429.81	279,429.81
Police Department	2,363.38	1,208,841.75	1,211,205.13
Department of Engineering and Public Works	34,897.98	2,480,416.50	2,515,314.48
Public Works, city of Manila		378,562.65	378,562.65
Total	108,041.10	5,184,731.32	5,292,772.42

Number of employees paid monthly salaries by disbursing officer.

Month.	Municipal Board.	Law Department.	Fire Department.	Assessments and Collections.	Department City Schools.	Police Department.	Engineering and Public Works.	Total number.	Expense.
1903.									
July.....	42	65	127	158	294	982	2,768	4,436	P230,741.03
August.....	43	71	120	157	334	914	2,650	4,289	226,885.08
September.....	46	69	141	162	360	907	2,458	4,143	230,334.06
October.....	36	70	131	154	379	900	2,658	4,328	228,243.76
November.....	40	68	140	153	393	911	2,517	4,222	232,844.23
December.....	36	70	138	168	371	873	2,934	4,590	232,501.29
1904.									
January.....	41	70	142	165	427	929	3,606	5,380	271,917.77
February.....	36	72	144	159	458	893	3,732	5,494	278,730.42
March.....	39	77	152	151	474	868	3,793	5,554	284,438.54
April.....	37	74	158	157	460	876	3,775	5,537	277,328.62
May and June.....	69	142	300	320	945	1,745	6,704	10,225	532,481.51
Total.....	465	848	1,693	1,904	4,895	10,798	37,595	58,198	3,026,456.31

Number of persons in employ of the city on June 30, 1904.

Department.	Americans.			Filipinos.			Grand total employed.
	Monthly employ-ees.	Daily employ-ees.	Total employ-ees.	Monthly employ-ees.	Daily employ-ees.	Total employ-ees.	
Municipal Board.....	13	-----	13	23	-----	23	36
Law Department.....	22	-----	22	50	-----	50	72
Fire Department.....	75	-----	75	56	20	76	151
Engineering and Public Works.....	98	11	109	136	2,965	3,101	3,210
Assessments and Collections.....	28	-----	28	130	-----	130	158
Police Department.....	390	-----	390	488	-----	488	878
Department of City Schools.....	1	188	189	186	97	283	472
Public Works, city of Manila.....	-----	-----	-----	-----	206	206	206
Total.....	627	199	826	1,069	3,288	4,357	5,183

Statement of expenditures for the care of city prisoners confined in Bilibid Prison during the fiscal year 1904.

Month.	Thirty-cent ration.	Twenty-cent ration.	Amount.	Total.	
				United States currency.	Philippine currency.
July.....	{ 1,088	-----	326.40	\$2,563.60	P5,127.20
August.....	{ 1,125	11,186	2,237.20		
September.....	{ 954	12,328	337.50	2,803.10	5,606.20
October.....	{ 954	12,572	2,465.60		
November.....	{ 716	14,269	286.20	2,800.60	5,601.20
December.....	{ 625	14,109	2,514.40		
January.....	{ 784	12,969	286.20	3,140.00	6,280.00
February.....	{ 765	12,059	2,653.80		
March.....	{ 1,183	12,777	214.80	3,036.60	6,073.20
April.....	{ 919	12,248	2,821.80		
May.....	{ 940	11,763	187.50	2,857.30	5,714.60
June.....	{ 797	12,043	2,609.80		
Total.....	10,850	151,672	-----	33,589.40	67,178.80

NOTE.—Thirty-cent rations are for American and European prisoners and 20-cent rations are for Filipino and Chinese prisoners.

REPORT OF THE CITY ENGINEER.

OFFICE OF THE CITY ENGINEER,
Manila, September 26, 1904.

SIR: I have the honor to submit the following report of the work carried on under the direction of the City Engineer of Manila by the Department of Engineering and Public Works for the fiscal year 1904:

The department has been in charge of Mr. O. L. Ingalls, City Engineer, from July 1, 1903, to September 23, 1903; in charge of Maj. J. F. Case, City Engineer, from September 23, 1903, to June 15, 1904, at which time he was granted permission to visit the United States; and in charge of S. B. Patterson, first assistant city engineer, Acting City Engineer, since that date.

The department is organized with the following offices:

- (1) Street construction and bridges, Mr. L. F. Patstone, superintendent.
- (2) Street cleaning, parks, collection and disposal of city refuse, Mr. J. C. Mehan, superintendent.
- (3) Water supply and sewers, Mr. Robert G. Dieck, superintendent.
- (4) Buildings, illumination, and plumbing inspection, Mr. L. A. Dorrington, superintendent.
- (5) Drafting and surveys, S. B. Patterson, first assistant city engineer.
- (6) City shops, George P. Nieman, superintendent and property clerk.

The following is a summary of the work performed under the several offices, a more detailed statement of which will be found in the reports of superintendents hereto appended:

STREET CONSTRUCTION AND BRIDGES.

The work of repairing the streets throughout the city has been continued, and practically all of the streets in the city are now surfaced and in good state of repair. Many old streets have been elevated so as to afford proper drainage, and a number of new streets have been constructed in Ermita and Malate, a section of which is rapidly developing. The new streets so built have been put in at a proper grade and built complete with curbs, sidewalks, etc.

The street work is, however, in a transitory state, as it is not deemed advisable to lay permanent pavement until such time as the sewers and water pipes for the new system shall have been installed. Contracts have,

however, been let for repaving Calles Rosario and the Escolta with Australian wood blocks laid upon a bed of concrete. This work was let to C. H. Belden, general superintendent of the J. G. White Co., and the work on Calle Rosario has already been completed (August).

In connection with the Escolta, this will form a continuous improved pavement from Plaza Calderon de la Barca to Plaza Santa Cruz, a distance of 850 meters. In connection with the above paving the city will install cement curbs and lay cement sidewalks, the walks to be paid for by the property owners.

On account of the fact that all materials for street work have to be brought into the city from a distance and deposited at various landings along the river or esteros, long hauls are necessary to transport the material to the site of the work. Through the year much of the land transportation for the work has been hired at prices for double team and driver ranging from ₱12 to ₱8 per day. This method was found expensive and unsatisfactory, and all of the teams for this work should be secured from the city corral.

During the year the work of laying curbs for sidewalks has been begun and considerable progress has been made, namely, along the Wallace field and the Bagumbayan Drive, on Calle Moriones, Calle Cervantes, and Calle San Miguel. The manner of laying this curb has been much improved and it is now built in place very rapidly and cheaply. These curbs are placed to the correct grade and in accordance with the approved street lines, so that in all cases they form a part of the permanent improvement, and it is the policy of this department to install them as fast as blocks or entire streets are cleared of obstructions. The city is practically without sidewalks worthy the name, and the installation of curbs will serve as an impetus and model to the property owner, besides allowing the street to be placed at its ultimate grade, and thus making its maintenance a much less expensive matter.

Three important improvements have been made during the year, namely, the opening of suitable entrances to the Walled City at Calle Palacio, Calle Victoria, and Calle Aduana. The relief afforded by the substitution of these broad, new streets for the narrow, serpentine entrances can only be properly appreciated by persons who have been compelled to use the old gateways.

The bridges of the city have been placed in good repair. A contract has been placed for a lift bridge over the Binondo Canal at Calle Soledad, which will when completed afford direct communication between the business section and the custom-house and wharves along the Pasig. The work will be completed during the fiscal year 1905. Plans have also been prepared and the work advertised for the construction of a bridge over the Pasig to replace the present Ayala Bridge. The new bridge will have two spans, 202 and 242 feet, center to center, and

a 22-foot clear roadway. Bids will be opened December 1, 1904, and the work completed about one year from that date.

STREET CLEANING AND PARKS, COLLECTION AND DISPOSAL OF CITY REFUSE.

During the year this office has much increased in both size and efficiency. All the streets in the city are now cleaned at varying intervals, regulated by the needs in each case.

Several plazas, the grounds around public buildings, etc., are being parked and the work of remodeling the Botanical Gardens carried forward. The funds available for park work are limited and at present it is impossible to undertake any general scheme of development. The improvements already under way have, however, done much to beautify the city.

There has in the past been no available supply of trees and shrubs for use in street and park work, and during the coming year a nursery will be started in order that a supply of trees may be available for use upon the streets and also ready for use at such time as the general park scheme is undertaken.

In February, 1904, the pail system, formerly operated under the Insular Board of Health, was transferred to this office, and has been managed very successfully, the transportation expenses having been reduced about one-half. This work, together with the collection of garbage, is done at night, and all fecal matter, etc., is transferred to the steam barge *Pluto*, built especially for this work, and dumped at sea. The garbage is burned at the city crematories at Palomar, Santa Cruz, and Paco.

The city stables at Palomar are in excellent condition and the grounds have been graded and improved. The stock is well cared for and in good condition. A veterinary hospital was constructed during the year, and has proved of great value in keeping the stock in a healthy condition.

The amount of transportation owned by the city is not sufficient for the work to be done, but this will undoubtedly be remedied by changes contemplated for the coming year.

WATER SUPPLY AND SEWERS.

Since its first organization the work of this office has increased several fold, and it is now thoroughly organized and equipped.

The work carried out during the past year has consisted in making new pipe installations throughout the city, and replacing small pipes with those of large size, and generally overhauling the entire system and putting it in shape to connect with the new water supply to be constructed in the near future.

A number of storm-water sewers have been constructed, thus relieving several badly flooded districts, and in addition a general study has

been made for a system of storm-water drainage and plans and estimates for several districts have been completed.

The city property at Santolan and Deposito, in charge of this office, has been much improved and is now in excellent condition. Especial attention is invited to the detailed report hereto appended.

BUILDINGS AND PLUMBING INSPECTION.

All plans for buildings in the city, whether public or private, pass through this office for inspection and approval before the work is commenced. The city is divided into districts, each in charge of an inspector, who supervises all building work under way and sees that it is carried out in accordance with the approval plans and the city ordinances. Existing buildings are also inspected, and during the year many of them which had become unsafe have been condemned and ordered removed.

Economy is effected in the cleaning and care of all buildings owned and rented by the city and in charge of the head of this office—viz, markets, schoolhouses, and police stations—as the services of the above-mentioned inspectors are utilized for this work.

The work of plumbing inspection has recently been added to this office. The city ordinances are incomplete upon this subject, but a new ordinance is under preparation. This is an important branch of work, and upon the enforcement of proper plumbing regulations depends in a large measure the health and welfare of the community.

DRAFTING AND SURVEYS.

This office has been occupied mostly upon street work. The records of previous work were found to be very incomplete and indefinite, and it has been necessary to resurvey practically all the streets in the city for the purpose of fixing the street lines. When a question arose regarding any particular street it was resurveyed and the width and general layout studied as a whole in connection with the general scheme for that section. The plans were then presented to the Municipal Board and the width of street, etc., fixed by resolution. The plans as approved will serve as a basis for all new street work, and new buildings are made to conform to the approved lines, and in the course of time the streets will be widened and straightened. At first glance the process seems a slow one, but its results are already apparent in many localities throughout the city.

All plans and specifications for engineering work are prepared in this office, and several standard methods of construction have been devised.

The work of the office has been systematized, and it is believed that more and better work is being accomplished than ever before in the history of the office.

CITY SHOPS.

The city shops, located on Calle Arroceros, form one of the most important and interesting parts of this department. All the repair work of the department is carried on here, from harness repairing to rebuilding of heavy trucks. A great deal of new work is also turned out, notable among which during the past year was twenty-six carts for garbage collection.

The storage warehouses are also located here and all city property is under the care of the shop superintendent, who is also the property clerk.

The equipment has been increased during the past year by the addition to the main shop 50 by 120 feet equipped with wood-working machinery, and several smaller sheds, etc., for storage.

The plant has been much improved and is in first-class condition.

Repair work for the other departments is also done here and the actual cost of the work charged to the department concerned.

PASIG RIVER WALL.

Under Act No. 669 of the United States Philippine Commission plans were prepared and the contract awarded for the construction of a concrete retaining wall along a portion of the south bank of the Pasig River, south of the Bridge of Spain, and under Act No. 1094, which provided \$30,000, United States currency, the work has been commenced.

The amount expended to June 30, 1904, was \$12,366.25, United States currency, leaving a balance on hand of \$17,633.75, United States currency.

The work consists in the construction of a wall, approximately 1,000 feet in length, constructed of concrete with stone coping, resting on a grillage and pile foundation of sufficient depth to allow an 18-foot channel at low water.

The old city wall is being removed along this portion of the river, and in addition an area of approximately 7,600 square meters will be reclaimed by filling out to the new wall.

The construction of this wall opens up a section of river front not heretofore available for commerce and will greatly facilitate the handling of the interisland freight.

The following table shows the engineering force employed in the improvement of river front and construction of river wall:

Position.	Number.	Salary.	Remarks.
Engineer in charge.....	1	P3,600	American.
Inspector.....	1	2,000	Do.
Rodman.....	1	1,800	Do.

SUMMARY.

The following statement shows in condensed form the money expended and work performed by the Department of Engineering and Public Works during the fiscal year ending June 30, 1904:

Salaries and wages.

Salaries:	
Office of the City Engineer	P37, 854. 61
Water supply	46, 532. 99
Street cleaning and garbage	38, 335. 90
Labor, street cleaning and garbage	186, 267. 46
Salaries, street construction and bridges	35, 324. 44
Labor:	
Street construction and bridges	126, 221. 70
Rock quarry	32, 325. 50
Salaries, buildings and illumination	20, 098. 84
Labor, buildings and illumination	35, 752. 50
Salaries:	
Building inspection	8, 962. 24
Inspection of boilers	890. 00
City shops	23, 608. 29
Labor, city shops	13, 110. 69
Salaries, drafting and surveys	10, 263. 30
Salaries and labor:	
Sewers	6, 451. 39
Weights and measures	3, 600. 00
Transportation	92, 959. 92
Labor, transportation	49, 634. 66
Salaries:	
Survey, new water and sewer systems	29, 768. 20
Completing survey work	5, 316. 19
Parks	2, 290. 00
Labor, parks	18, 525. 75
Salaries, cemeteries	1, 970. 00
Labor, miscellaneous	28, 381. 45
Salaries, Morris A. Mont, accrued leave	400. 00
Labor:	
Completing survey work	6, 682. 53
Cemeteries	14, 809. 70
Salaries, temporary building inspection	3, 000. 18
Labor, water supply	33, 241. 69
Total	912, 580. 12

Public works.

Repairs to city bridges	62, 796. 12
Purchase and transportation of drain, road, and street material	128, 392. 18
Repairs and supplies, barges and launches	35, 968. 48
Coal for crematories	15, 411. 32
Coal and oil quarry	4, 378. 60
Forage	75, 141. 64
Repairs to stables and corrals	9, 466. 58

Public works—Continued.

Purchase of tools, miscellaneous supplies, hose, etc	P36,262.78
Repairs to harness, carts, and wagons	25,086.76
Purchase of material, shoeing public animals	2,860.87
Maintenance of public grounds and parks	11,149.07
Development and extension of rock quarry	17,747.74
Repairs to markets and municipal buildings	60,355.07
Care, cleaning, and supplies, municipal and public buildings	2,223.46
Operating and repairs to dredger	258.64
Lighting public buildings, parks, and streets	94,267.54
Material for extension of electrical service	4,345.76
Oil, lighting public buildings	2,668.94
Repairs to crematories	2,923.72
Purchase of horses and other animals, carts and harness, and hire of bull carts	72,803.55
Veterinary medicines and supplies	1,031.65
Supplies for cemeteries	13.20
Construction of river wall	3,596.01
Purchase and installation of machinery and tools	9,507.37
Construction of rock scows	19,065.51
Purchase of paving blocks for Escolta and Rosario	41,485.57
Purchase and location of sewer pipe	12,347.09
Purchase and location of fire and post hydrants	22,462.83
Location of water mains	32,670.54
Repairs to water system	14,485.84
Repairs to Santolan Road	8,643.78
Repairs to machinery, pumping station	3,085.71
Cleaning reservoir and care of grounds	3,045.15
Transportation of materials for water supply	1,472.75
Purchase and installation of scales and track at matadero	1,490.15
Coal, pumping station and water supply shops	34,342.68
Miscellaneous repairs and supplies, water supply	19,004.91
Water pipe and fittings for extension and repair to water system	85,120.00
Grading and improving grounds, repair shop	7,476.66
Purchase of means of transportation	14,224.00
Repairing and cleaning old sewers	4,315.71
Cleaning estero	1,969.70
Purchase of pails and covers	39,479.00
Purchase of commodes	382.50
Purchase of pail system	384,664.10
Expenses of pail system	35,540.70
Total	1,465,431.93

Contingent expenses.

Miscellaneous supplies, pail system	770.25
Purchase of office furniture and supplies	6,027.52
Rent of police stations	12,390.65
Telephone service	2,626.80
Supplies, contingent, general city survey work	3,516.06
Labor and supplies for renumbering houses	315.04
Burial of paupers, etc	11,268.00

Contingent expenses—Continued.

Hire of vehicles-----	P11, 168. 34
Rent, miscellaneous-----	10, 794. 86
Rent, schoolhouses-----	39, 632. 73
Printing and binding-----	3, 894. 20
Total-----	102, 404. 45
Grand total-----	2, 480, 416. 50

The department has received the hearty support of the employees, and the energy and loyalty displayed have been marked. This has been greatly appreciated, and it is desired to thank the employees for their able assistance which has made the work of the past year a success.

Respectfully submitted.

S. B. PATTERSON,

First Assistant City Engineer, Acting City Engineer.

The SECRETARY OF THE MUNICIPAL BOARD,

Manila, P. I.

REPORT OF THE SUPERINTENDENT OF STREET CONSTRUCTION AND BRIDGES.

SIR: I have the honor to submit the following report of the work of this office for the fiscal year ending June 30, 1904:

For the purpose of administration and of systematizing the work the city has been divided into districts as follows:

District No. 1: Intramuros, Ermita, and Paco west of Paco Estero.

District No. 2: San Nicolas, Tondo, and Binondo.

District No. 3: Santa Cruz, Quiapo, Sampaloc, San Miguel, and Santa Mesa.

District No. 4: Paco east of Paco Estero, Malate, Santa Ana, and Pandacan.

Bridge District: One district for city.

Each district is in charge of an inspector who reports daily to the superintendent the condition of his district, progress of work under way, etc.

The transportation used by this office is furnished in part by teams owned by the city and in part by teams hired by the day. The hiring of teams by the day has in the main proved unsatisfactory on account of the expense and it is planned during the coming year to increase the number of teams owned by the city and to do away entirely with hired transportation.

The following table shows the class of labor employed in the actual work of street construction and repair to bridges, the assignment by districts, the rate of pay, per day or per month, the average daily

transportation, including the amount furnished by the city and the amount hired by contract:

Class of labor employed in street construction and bridges.

Class of labor.	Division, by districts.					Rate.	
	No. 1.	No. 2.	No. 3.	No. 4.	Bridge.	Per month.	Per day.
Inspectors:							
Class A			1			P233.34	
Class B	1	1		1		200.00	
Bridge					1		7.00
Foremen:							
First class	1	2	1	1		100.00	
Second class			2		1	70.00	
Third class	6	4	2	3	2		1.50
Fourth class	3	3	3	2	2		1.20
Road-roller engineer:							
Class A	1		1			150.00	
Class B		1				100.00	
Carpenters					24		1.50
Masons		12	10	5	26		1.50
Laborers	123	114	85	80	46		1.00
Total	135	137	105	92	102		

Transportation, street construction and bridges.

District.	City double team, P7.82.	City single team, P2.92.	Hire double team, P10.00.	Cara-bao cart, P2.50.
No. 1	4	6	2	7
No. 2	2	3	5	6
No. 3	3	7	2	3
No. 4	3	3	3	5
Bridge		2		2
Total	12	21	12	23

Three extensions of streets through the city wall have been made, on Calle Aduana, Calle Victoria, and Calle Palacio, thus affording means of access to the Walled City. The former entrances crossed the moat upon a narrow bridge and passed through openings in the wall wide enough for one team only. The inconvenience caused to traffic compelled to use these narrow and serpentine entrances was enormous, and the danger of accident not small. The Aduana and Victoria extensions are new openings which afford safe and easy entrance through the walls at places where there was no entrance formerly, and save a long journey around for many teams daily. The Palacio extension is a new opening at one side of the former entrance. There are still two gates which should receive attention and be either widened or have new entrances made near their present location, namely, the Santa Lucia and Parian Gates at either end of Calle Real, Walled City. This street accommodates a large traffic and leads directly from the new port works through the center of the Walled City, connecting at its eastern end with the Bridge of Spain and the Santa Cruz Bridge over the Pasig. The construction of a short branch across the outer moat would also connect directly with Calle Concepcion and the Ayala Bridge.

The length of streets is now approximately 145,550 linear meters, or 90.4 miles, and the pavement of the city consists of wood blocks, granite blocks, and macadam, apportioned as follows:

	Square meters.
Wood blocks.....	3, 969
Granite blocks.....	50, 695
Macadam.....	1, 293, 534
Total.....	1, 348, 198

New streets built during the year.

Street.	From—	To—	Length.	Width.	Curb.	Gutter.	Cost.
			Meters.	Meters.	Linear meters.	Square meters.	
General Wright ¹	Herran	San Andres	1500	15	1, 299	500	P15, 956. 98
Zobel	San Marcelino	Comillas	2175	12			1, 449. 78
E Street	Isaac Peral	Padre Faura	3295	15	325	336	10, 509. 24
San Marcelino	Nozaleda	Herran	4430	18	885	430	14, 456. 44
Aduana ²	Malecon	Postigo	1130	15			4, 264. 72
Victoria ³	Muralla	Bagumbayan	2200	15			14, 652. 52
Palacio ⁴	do	do	220	15			948. 54
Total			1, 950		2, 509	1, 266	62, 338. 22

¹1,100 cubic meters excavation; 1,220 cubic meters rock fill for foundation.

²Not curbed; refuse stone used.

³Includes 3,500 cubic meters fill.

⁴1,650 cubic meters fill.

⁵Includes 2-pipe 60-centimeter culverts 19 meters in length, cost P463.20, and 76 meters of 30-centimeter cement pipe; sewer, 2,762 cubic meters of sand filling, 546 cubic meters of stone filling, and 1,300 square meters of macadam.

⁶Not curbed.

⁷Includes one culvert, consisting of 65 meters of 60-centimeter cement pipe, cost P1.081; one culvert of 75 meters of 60-centimeter cement pipe, cost P1,539, 4,564 cubic meters of sand filling, and 1,913 cubic meters of stone filling.

⁸Course of construction.

Streets resurfaced during the year.

Street.	From—	To—	Area.	Cost.	Cost per square meter.
			Sq. meter.		
Malecon	Santa Lucia Gate	Luneta	4, 945	P1, 829. 50	P0. 36
Santa Mesa Road ¹	Race track	City line	7, 713	2, 914. 14	.38
San Pedro Macati	Real	do	4, 612	3, 169. 94	.68
Fundicion	Palacio	Real	619	255. 68	.40
Magallanes	Victor a	Beaterio	2, 176	851. 72	.40
Solana	do	Northerly	1, 670	500. 68	.38
Cabildo	do	Fundicion	417	116. 64	.28
Lavezares	Madrid	Asuncion	522	171. 08	.32
Iris	Alix	Iris Bridge	11, 973	3, 042. 28	.26
Real (Paco)	Lasdamas Bridge	Peña-Francia	4, 284	1, 348. 96	.32
Moriones	Lemery	Estero	2, 213	1, 769. 70	.80
Nozaleda	Herran	Padre Faura	3, 898	1, 191. 76	.30
Real (Ermita)	Bagumbayan	San Luis	1, 642	637. 24	.38
Ilang-Ilang	Lavezares	Southerly	493	378. 66	.76
Echague	Plaza Goiti	Quinta Bridge	6, 377	2, 548. 36	.40
Plaza Goiti			2, 369	1, 093. 26	.38
Northerly approach to Santa Cruz Bridge			1, 771	832. 48	.58
Lardizabal	Manrique	Westerly	398	297. 46	.76
San Miguel	Quinta Bridge	Novaliches	4, 935	2, 201. 48	.44
Domingo	(Pico)		1, 153	805. 90	.70
Arroceros	Colgante	Concepcion	3, 568	3, 355. 70	.60
General Solano ²	Ayala	Novaliches	3, 739	803. 70	.20
Singalong Road	City line	San Andres	13, 317	11, 477. 34	.54
Pasay Road ³	San Antonio Abad	Race track	6, 218	4, 480. 58	
Solis	Bridge.				
Gagalangin ⁴	Gagalangin	Lico	2, 235	3, 136. 66	1. 40
	Maypajo Bridge	Pretil Bridge	19, 236	19, 915. 18	1. 02

¹Includes one culvert three 30-centimeter pipe, 8.3 meters.

²Graveled

³City furnished material and tools and province the labor.

⁴6.2-mile haul round trip.

Streets resurfaced during the year—Continued.

Street.	From—	To—	Area.	Cost.	Cost per square meter.
			<i>Sq. meter.</i>		
Reten			1,392	₱785.72	₱0.56
Road to Santa Mesa barracks.	Santa Mesa	Barracks	622	711.76	.82
Cervantes ¹	Bilibid	Sangleyes	12,606	3,725.16	.28
Sangleyes ¹	Cervantes	Cemetery	5,414	1,358.26	.24
Cabildo	Beaterio	Santa Potenciana	520	285.90	.54
San Nicolas	Caballero	Madrid	690	444.48	.64
Caballero	Lavezares	San Nicolas	355	283.52	.50
Alix	Manrique	Lavanderos	3,146	1,137.10	.36
Padre Faura	Nozaleda	Real	1,125	800.62	.70
Elcano	Barraca	San Nicolas	636	260.06	.52
Balicbalic	Loreto	Easterly	736	420.78	.56
Nueva	Barredo	Remedios	2,580	1,176.26	.44
San Andres ¹	Singalong	Westerly	3,685	1,224.32	.34
Real, Intramuros	Baluarte	Magallanes	708	399.34	.56
Lemery	Pretil Bridge	Southerly	869	1,010.02	1.16
Alegui	Tanduay	Alva	2,181	703.34	.32
San Pedro ¹	Carriedo	Bilibid	4,053	1,233.68	.30
Real, Santa Ana	Plaza		2,335	948.86	.40
Pavia	Lemery	Santa Maria	3,795	2,630.08	.68
Alejandro VI	Alix	Tortuosa	1,182	683.02	.58
Principe	Jaboneros	Peñarubia	3,166	1,604.08	.50
Misericordia	Lacoste	Paz	1,968	748.02	.40
Numancia ²	Muelle de la Reina	Northerly		1,046.50	
Marques Comillas	Ayala Bridge	Trinidad Bridge	4,450	3,556.50	.80
Quesada ³	Pavia	Moriones	884	1,169.42	1.34
Aviles ¹	Alix	Bridge	2,605	714.50	.26
Arranque	Espeleta	Paz	3,216	1,071.64	.34
Total			177,453	95,773.90	

¹Graveled.²788 square meters macadam, 300 linear meters curb, 50 square yards gutter.³Refuse stone for foundation.

PALOMAR CREMATORY.

The work of filling the approach to the crematory, building China stone gutters, and macadamizing the driveways has been performed by this department. Six hundred and ninety-three cubic meters of sand for filling the approach was obtained from Tondo Beach, and 1,646 square meters of driveways macadamized, at a cost of ₱2,560.24, Philippine currency.

CALLE SACRISTIA BETWEEN ROSARIO AND NUEVA.

The buildings have been removed on the south side of this street and the street widened to 12 meters. This widening greatly relieves the traffic at this point.

PANDACAN.

The streets in this section were originally built of Guadalupe blocks, the space between the same being filled with dirt. These streets had become very badly out of repair, with the stone blocks scattered over the street, making them almost impassable. The stones were broken up with sledge hammers and used in the foundation of the new roadway, and the refuse stone necessary to complete the foundation was obtained from the demolished city wall, the material being loaded in bancas at

the city wall and towed to Pandacan. After the refuse stone had been placed in the foundation it was thoroughly rolled and a 2-inch layer of fine gravel was spread over the top to form the wearing surface. The area resurfaced was 6,534 square meters, at a cost of ₱2,023.10, Philippine currency.

CALLE MORIONES, TONDO.

The work of filling this street to subgrade and installing cement curbing was commenced in May and is still in progress. Two thousand seven hundred and seventy-nine cubic meters of sand filling have been obtained from the beach, 932 linear meters of cement curbing installed, and 52 meters of 30-centimeter cement pipe laid, at a cost of ₱5,787.44, Philippine currency.

REMOVAL OF CITY WALL FROM ADUANA GATE TO THE ALMACEN GATE.

The work of demolition was commenced May 28 and completed on January 15, and the work was performed by prison labor, under a guard of one American and three native patrolmen. The force employed from May 28 to August 15 consisted of thirty prisoners per day, and from August 15 to January 15 fifty prisoners per day were used. The prisoners left Bilibid Prison at 6.30 a. m., reaching the wall in time to start work promptly at 7 o'clock, and the hours of work were from 7 to 11.30 a. m. and from 1 to 4 p. m., thus allowing the prisoners one and one-half hours for dinner, and making the actual number of working hours seven and one-half. The supervision consisted of one American and one native foreman and was sufficient to handle the force to advantage.

The work performed by the prisoners was of a fair quality, although not equal to the average laborer on street work, as their physical development was not as good. Two gateways and nineteen casements were removed, making approximately 6,386 cubic meters of wall removed. This material was used by the Warden of Bilibid Prison, at Palomar crematory, and in various repairs to streets and bridges.

The use of dynamite was tried on three casements, and was found to be a very cheap and quick way of razing the wall. The charges were placed inside the casemate about four feet below the springing line of the arch, thus allowing the arch to fall in when the blast was made. The above blasts were made just at the end of the dry season, but after the rainy season commenced the stone became saturated with water, making them so spongy that it was impossible to use dynamite to advantage.

CEMENT GUTTERS.

The construction of the cement gutters shown in the succeeding table have given much-needed relief, and it is the intention to continue this

work so as to cover all districts where trouble has been experienced from stagnant water standing in the street. These gutters allow of a thorough flushing, and also enable this department to keep the roadway in better repair, as they obviate the trouble experienced by the water seeping in to the roadbed. These 30-centimeter gutters or half tubes were originally bought by contract, at so much per linear meter delivered on the site of the work; the cement gutters installed in the District of San Nicolas, however, have been built in place and at a much lower rate per meter than those bought by contract and it is the intention to have suitable forms made so that all this work may be built in place.

The sewer department is at present engaged in designing a system for the disposal of surface water, which will enable this office to install gutters and curbing and thus put the streets in a much better sanitary condition.

Streets where gutters have been installed during the year.

Street.	From—	To—	Class, linear meters.				Cost.	Cost per linear meter.
			Cement.		China stone.	Box-ing.		
			40 centim-eter.	30 centim-eter.				
Fulgueras	Azcarraga	Lacandola		681			¹ 2,248.04	¹ 3.30
Padre Rada	Lemery	Fulgueras		531			1,749.86	3.30
Alejandro VI ²	Alix	Tortuosa	150	155	325		2,425.14	
Gastambide	do	do		857			2,973.38	3.46
Tortuosa								
San Anton	Gastambide	Reten	131	161			³ 2,709.64	
Reten	Tortuosa	San Anton						
Benavides	Salazar	Soler			354		486.96	1.40
Izquierdo	Magdalena	San Lazaro				564	1,177.06	2.08
	Estero.	Estero.						
Arranque	Tetuan	Northerly			176		¹ 432.24	2.44
Lardizabal	Manrique	Easterly			63		⁴ 929.36	
Manrique	Castano	Lavanderos			29		⁵ 291.38	
Castanos					35		⁶ 304.97	
Lavanderos	Manrique	Easterly			243		902.26	
Barcelona	San Nicolas	Northerly			85		⁷ 312.42	
Paz	Timbugan	Trozo Estero.				303	219.58	
Pescadores	Zaragoza	Padre Rada		185			592.12	3.20
Ylaya	Padre Rada	Azcarraga		440			1,409.00	3.20
Sevilla ⁸	Clavel	Lara		731			457.38	.62
San Nicolas ⁹	Elcano	Santo Cristo		102			207.40	2.02
Principe ¹⁰	Peñarubia	Muelle		485			407.60	.84
Madrid ¹⁰	Lara	Clavel		1,155			790.48	.70
Barcelona	Peñarubia	Aceiteros		682			695.04	1.02
Ylaya ¹¹	Azcarraga	do		217			588.80	2.72
Tavera ¹²	do	do		101			288.26	2.84
Lara ¹²	Principe	Sevilla		120			117.40	.96
Misericordia ¹¹	Lacoste	Paz		165			468.60	2.84
Soler ¹³	Almansa	Misericordia		76			322.28	
Almansa ¹¹	Alcala	Paz		327			1,166.16	3.56
Aceiteros	Barcelona	Madrid		306			241.36	.78
Tribunal	Jaboneros	San Fernan- do.		19			39.64	
Camba	Aceiteros	Clavel		149			159.10	1.08
Clavel	Camba	Barcelona		377			278.96	.70
Total			281	7,822	1,310	867	25,696.64	

¹ Includes grading roadway.

² Refuse stone for foundation.

³ Includes 433 cubic meters stone filling and 1,060 square meters macadam.

⁴ Includes 350 square meters macadam.

⁵ Includes 315 square meters macadam.

⁶ Includes 467 square meters macadam.

⁷ Includes 383 square meters macadam.

⁸ Concrete gutter built on ground.

⁹ Concrete gutter built on ground and 275 square meters graveled.

¹⁰ Concrete gutter on place.

¹¹ Half pipe.

¹² Concrete gutter.

¹³ Half pipe, extra work on foundation.

CEMENT CURBING.

The cement curbing installed during the last eight months has been built in place. Formerly this curb was made in meter lengths at the city shops and then hauled to the street and installed. It has been found much cheaper and more satisfactory to build the curb in place by setting the wooden forms to line and grade, then depositing the concrete and allowing it to set for twenty-four hours, afterwards removing the forms and facing the cement up. The curbing as built in place is 18 inches in depth, 6 inches wide at the top, and 8 inches at the bottom. The cement used has been Green Island Portland (Hongkong brand), mixed in the proportion of 1:2 to $\frac{1}{2}$:5 for the lower portion, and 1:1 for the 1-inch facing from the top. The average cost of this class of curb 1 mile from the city shops has been ₱1.948, Philippine currency, per linear meter. Portland cement figured at ₱4.90, Philippine currency, per barrel; sand at ₱1.20, Philippine currency, per cubic meter; and broken stone at ₱2.36, Philippine currency, per cubic meter.

The following is the linear meters of cement curb and the square meters of cement sidewalk built during the year:

Item.	Quantity.	Cost.	Cost per linear meter.	Cost per square meter.
Linear meters of curb made at shops.....	1,536	₱3,686.40	₱2.40	-----
Linear meters of curb built in place.....	7,223	16,245.52	2.24	-----
Square meters of cement ¹ walk.....	3,043	10,650.50	-----	₱3.50
Total.....		30,582.42	-----	-----

¹Portland cement, 5 inches of concrete 1:2 to $\frac{1}{2}$:5; 1 inch of mortar 1:1.

SIDEWALKS.

During the year 1,824 notices have been served for repairing sidewalks in accordance with section 9 of Ordinance No. 3, passed by the Municipal Board December 16, 1901. This ordinance has enabled this office to keep the sidewalks in fair condition, yet when extensive repairs were necessary much trouble has been experienced with the poor material used, such as inferior cement, etc. Better results would be obtained if the walks were built directly by the city and the cost of same levied on the abutting owner.

One thousand five hundred and eighty permits have been issued for erecting stagings, fences, etc. Sixteen notices were served for removing fences or houses encroaching on the public way.

STEAM ROLLERS.

There are three 12-ton rollers in the department. Two are Buffalo Pitts and one is the Springfield-Kelly make. These rollers are in fair

condition and have run three hundred and twelve days each during the past year.

The following statement shows the cost of operating one roller per day:

1 engineer, at P150 per month	P3.76
1 oiler and assistant	1.20
1 waterman	1.00
Total labor	7.96
510 pounds Australian coal, at P13.86 per ton	3.16
Oil, waste, etc	1.32
Repairs	1.30
Total daily cost of operating	13.74

CITY QUARRY.

This quarry is located on the Island of Talim, Laguna de Bay, distant by water 27 miles from the Bridge of Spain.

The 125-horsepower engine has given very good satisfaction during the year. No breakdowns or accidents have occurred to the same, and it has kept the mill running without the necessity of a shut down.

There are at present three crushers at the mill—one No. 6 Gates, capacity 40 tons per hour; one Austin, capacity 15 tons per hour; and one Blake, capacity 8 tons per hour.

A new head spider and set of concaves have been delivered for the Gates crusher to replace the old ones, which have become badly worn.

The Austin and Blake crushers have given very good satisfaction, but are now practically worn-out, having been in use since the early days of the American occupation. A new crusher will have to be installed to replace these old ones, and it is the intention to install another No. 6 Gates similar to the one at present in operation.

The storage bins were completed during the month of August and have been in operation since that date, except for a portion of March and April, when the water became so low in the lake that it was impossible to use them. The city dredge was used to dredge out that portion directly in front of the bins and no further trouble is expected.

The capacity of the bins is 75 cubic meters, and it is the intention to build three more as soon as the money is available.

The cost of getting out the stone for the crusher has greatly increased owing to the large amount of waste which it has been necessary to handle. The face of rock which was originally worked has run into a large deposit of waste, making it necessary to handle two tons of waste for every ton of stone quarried.

In order to keep the mill running to advantage a donkey engine has been temporarily installed for hauling the cars up the incline from the

lower level just south of the mill, there being a better deposit of stone at this location.

The work of moving the waste above referred to is now in progress and the indications point to better rock at a lower level.

The following statements show the force employed, amount of stone crushed, etc.; number of days worked during the year, 312:

Class of labor, number employed, and rate.

Class of labor.	Average number per day.	Rate.
Foreman	1	¹ ₱200.00
Quarryman	1	27.00
Engineer	1	23.50
Assistant engineer	1	22.50
Capataz	1	23.50
Laborers	95	21.00
Total	100	

¹ Per month.

² Per day.

Cost of labor and work performed.

Month.	Cost of labor.	Cubic meters of stone crushed. ¹
July	₱2,386.00	1,736
August	2,486.00	1,534
September	2,276.00	1,692
October	2,336.50	2,594
November	2,404.00	1,904
December	2,765.50	2,293
January	2,845.00	2,823
February	2,975.00	3,570
March	3,125.00	3,395
April	3,971.50	3,547
May	3,640.00	3,364
June	3,719.50	4,593
Total	34,929.00	33,045

¹ Cost of crushing, ₱1.28 per cubic meter.

Cost of material used.

Coal, 235 tons, at ₱13.86 per ton	₱3,257.10
Dynamite, 6,450 pounds, at 30 cents per pound	1,935.00
Powder, 400 pounds, at 46 cents per pound	184.00
Oil and waste	644.24
Total	6,020.34

LAUNCHES.

The two launches, the *Washington* and the *Jan*, have been kept busy during the year towing the scows to and from the quarry, and also the flat scows to the dredge for sand. Thirty-three thousand and forty-five cubic meters of crushed stone have been hauled from the quarry and 16,497 cubic meters of sand from the dredge.

Both launches have been pulled out, examinations made of their bottoms, new bushings for the tail shaft installed, and the engines overhauled and put in good condition. The following statement shows the cost of operating the *Washington* per day:

One launch master, at ₱200 per month	₱7.04
One patron, at ₱60 per month	2.10
One engineer, at ₱60 per month	2.10
One assistant engineer, at ₱50 per month	1.76
One steersman, at ₱40 per month	1.40
Two fireman, at ₱30 each per month	2.10
Three sailors, at ₱20 each per month	2.10
Total labor	18.60
Coal, 1 ton, at ₱13.86	13.86
Oil and waste	2.44
Rope, etc .....	.32
Rice .....	.76
Repairs	1.22
Total daily cost of operating	37.20

SCOWS.

There are at present twenty-five scows for hauling broken stone and sand, twenty of which are of the cutter type and have a carrying capacity of 25 cubic meters each. The remaining 5 are of the deck or flat type, 3 of which have a carrying capacity of 60 cubic meters each, and the other two 15 cubic meters each. The five flat scows are used in hauling sand from the dredge in the Pasig River for use in building cement curbs and gutters.

It will soon be necessary to condemn the two smaller flat scows, but it is thought that the 23 remaining will be sufficient for the needs of the office during the coming year. Twelve of the above scows were at the city shops during the year at a cost of ₱1,460, Philippine currency, per scow.

Some of the scows are at present being overhauled at the city shops, the recaulking, resheathing, and painting with two coats of coal tar putting them in practically as good condition as when they were first launched.

The following statement shows the cost of operating one scow per day:

One pilot	₱1.30
Six sailors, at ₱1 each per day	6.00
Total labor	7.30
Rope, oil, etc .....	.42
Repairs .....	.26
Total daily cost of operating	7.98

BRIDGES.

There are fifty-five bridges and seventeen culverts in the city which have been under inspection and repair during the year. Each bridge receives a thorough inspection at least once a week, thus keeping the office well informed as to the condition of each bridge and reducing the liability of accident to a minimum.

Extensive repairs have been performed on eighteen bridges and general repairs on thirty-five bridges during the year.

This work has placed most of the bridges in good condition, making it possible for the steam rollers used in street construction to pass over them instead of going a mile or two out of the way as heretofore.

Location of the bridges where extensive repairs have been made, the class of repairs, and cost of same.

Location.	Class of repairs.	Cost.
Gandara Bridge at Calle Tetuan.	34 stringers 32 by 12 by 14 inches, 2,600 linear feet flooring. ¹	P6,999.96
Marquez Bridge on Calle San Rafael.	18 stringers 24 feet by 10 by 12 inches, 1,000 linear feet 3 by 12 inch flooring. ¹	1,779.90
San Geronimo Bridge, Calle Arlegui.	4 stringers 44 feet by 12 by 12 inches, 850 linear feet 3 by 12 inch flooring. ¹	2,115.60
Chinese Bridge, Calle Paz.	2,300 linear feet, 3 by 12 inch flooring. ¹	1,564.00
Tanduay Bridge over water pipe, Calle Tanduary.	18 stringers 19 feet by 5 by 8 inches, 810 linear feet 3 by 12 inch flooring. ¹	999.00
Tanduay second bridge over Tanduary Es ero, Calle Tanduary.	8 stringers 37 feet by 12 by 12 inches, 810 linear feet 3 by 12 inch flooring. ¹	1,484.00
Muelle de la Reina near works of port property.	485 linear feet 2 by 12 inch flooring. ¹	219.00
Gandara second bridge, Trozo Estero, near Lacoste.	8 stringers 40 feet by 12 by 12 inches, 16 braces 6 by 12 by 12 inches, 14 inches '02 by 6 by 12 inches, 1,000 linear feet 3 by 12 inch flooring. ¹	1,490.00
Trinidad Bridge, Calle Comillas.	800 linear feet 2 by 12 inch flooring. ¹	573.00
Mendoza Bridge, Quiapo Estero.	18 stringers 24 feet by 10 by 10 inches, 1,200 linear feet 3 by 12 inch flooring.	1,957.60
Azcarraga Bridge, Calle Azcarraga.	3 stringers 35 feet by 12 by 12 inches, 1,440 linear feet 3 by 12 inch flooring. ¹	1,423.40
Bridge of Spain	Scraping and painting	833.62
Maura Bridge, Calle Reina Regente.	do	78.70
Ayala Bridge	do	673.24
Iris Bridge over Bilbid Estero.	12 stringers 8 by 10 inches, 1,200 linear feet 3 by 12 inch flooring. ¹	2,785.24
Palomar Crematory Bridge	175 linear feet flooring	118.20
Bridge of Crematory (Paco)	Old bridge replaced by 3 pipe culverts	378.80
Quinta Bridge	1,300 linear feet flooring.	239.40
Santa Cruz Bridge ²	Scraping and painting	672.50
Total		26,375.16

¹ Ypil and yacal lumber.

² Not completed.

In addition to the general repairs as shown in the above table, the following has been performed by the bridge department.

General repairs have been made to the river wall from the Binondo Canal westerly.

The breakwater at the municipal tenement house has been rebuilt and extended.

Railings have been built around the masonry openings where the 26-inch water pipe crosses the road at the Retonda district of Sampaloc.

A retaining wall has been built in front of the yard of the pail system at Calle Moriones and Reina Estero.

A tool house 30 by 15 feet has been built on Calle Reina Regente for the use of District No. 2.

Two culverts have been constructed in Calle Victoria to provide temporary drainage for the moat. The culvert for the drainage of the outside moat consists of four tubes of 60-centimeter cement pipe, 18.7 meters in length, laid on a 12-inch concrete foundation. Cost of this culvert was ₱1,539, Philippine currency.

The culvert for the drainage of the inside moat consists of three tubes of 60-centimeter cement pipe, 21.7 meters in length, laid on a foundation of refuse stone. Cost of this culvert was ₱1,081, Philippine currency.

Summary of work performed during the year.

Streets built	square meters..	18, 640
Streets resurfaced	do	177, 455
Streets graveled	do	124, 731
Block paving relaid	do	4, 485
Crossing relaid	linear meters..	366
Box gutters built	do	1, 602
Flagstone gutters laid	do	1, 475
Concrete gutters built in place (30 centimeter)	do	3, 766
30-centimeter cement gutter on half pipe installed	do	4, 181
40-centimeter cement gutter on half pipe installed	do	325
40-centimeter cement pipe laid	do	75
30-centimeter cement pipe laid	do	52
Cement curb laid	do	8, 759
Cement sidewalk laid	square meters..	3, 043
Street signs made	do	850
Broken stone used:		
From quarry	cubic meters..	33, 045
Purchased by contract	do	2, 890
Gravel purchased by contract	do	10, 180

Respectfully submitted.

L. F. PATSTONE,

Superintendent Street Construction and Bridges.

The CITY ENGINEER, *Manila, P. I.*

REPORT OF THE SUPERINTENDENT STREET CLEANING, COLLECTION AND DISPOSAL OF CITY REFUSE.

MANILA, P. I., *June 30, 1904.*

SIR: I have the honor to submit the following report of street cleaning; street sprinkling; collection and disposal of garbage, rubbish, and

dead animals; collection and disposal of night soil; parks, cemeteries, and city transportation for the fiscal year ended June 30, 1904.

STREET CLEANING.

This is divided into seven districts, the work of each district being performed under the direction of native foremen.

American push brooms are used for sweeping, the use of native brooms having been discontinued. Owing to the lack of care taken by the residents of the city in disposing of refuse, this department removes paper, corn husks, fruit peelings, sugar cane, fecal matter, vegetable refuse, and rubbish of all kinds which are thrown by the occupants of tiendas and dwelling houses into the street.

Rakes, hoes, shovels, etc., are used for removing the deposits found in the gutters and the gutters are thoroughly flushed by using fire hose attached to the street hydrants. The gutters in the low districts of the city often fill during high tide with water from the esteros. Refuse of every kind remains on the street when the water goes out.

The street sweepings are collected at night in carts. This material is used for covering manure and rubbish dumped on vacant lots.

The people of San Felipe will not permit the employees of this department to clean the streets in that barrio. This matter is now under consideration.

The area cleaned, loads removed, and cost, etc., of street cleaning is shown in Tables Nos. 1, 2, 3, 4, and 5.

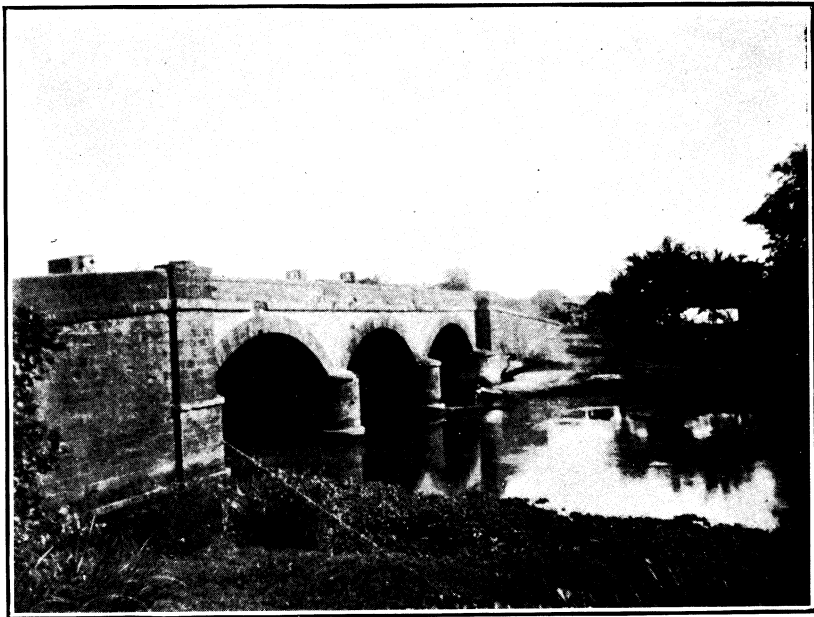
STREET SPRINKLING.

The streets are sprinkled by wagons, and by laborers provided with hose which they attach to the street hydrants. The area sprinkled, loads of water used, and cost, etc., of street sprinkling is shown in Tables Nos. 6 and 7.

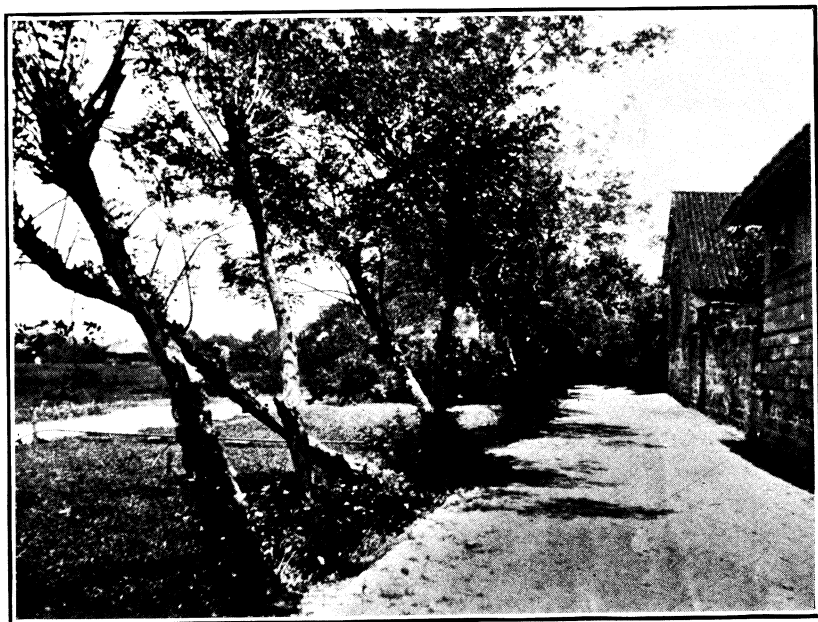
COLLECTION AND DISPOSAL OF GARBAGE, REFUSE, AND DEAD ANIMALS.

Under the provision of Ordinance No. 4 as amended by Ordinance No. 7, Ordinance No. 48, and Ordinance No. 56 the occupants of every building, premises, or place of business are required to place all garbage and rubbish in cans on the outer curb of the sidewalk between 8.30 p. m. and 5 a. m. or to notify the superintendent of street cleaning and parks of any unusual quantities of rubbish or trade refuse at least twenty-four hours before removal is necessary.

Employees of this department gather all the refuse washed ashore by the tide along the beach (from Bancusay to Fort San Antonio). Bancas are used for gathering refuse in the river and the esteros.



BRIDGE AT SAN JUAN DEL MONTE.



OLD STREET IN PANDACAN, SUBURB OF MANILA.

All garbage and rubbish is collected at night in carts. The collecting force is divided into seven districts, the work of each district being performed under the direction of native foremen.

Crematories are used for burning all house-garbage and such rubbish as can not be used for filling low land. The largest of these, a Morse-Bolger destructor of 120 tons' capacity, is built on Palomar Island, District of Binondo, and was placed in operation July 29, 1903.

The Paco crematory was used ten months and the Santa Cruz crematory was used two months during the fiscal year.

The per cent of combustible matter found in the garbage collected in the city of Manila is very small compared with the garbage collected in most cities in the United States, and for that reason a larger amount of coal is needed to consume it. Horse manure and rubbish of certain kinds are dumped into vacant lots which need filling. The use of scows for dumping garbage and refuse at sea was discontinued July 16, 1903, as this method of disposition proved expensive and unsatisfactory.

All dead animals under 30 pounds' weight are removed on the garbage carts. For removing animals of over 30 pounds weight a special wagon is provided.

The amount and cost of garbage, refuse, and dead animals collected and disposed of is shown in Tables Nos. 8, 9, 10, and 11.

Table 12 shows amount of material removed in street cleaning, collection and disposal of garbage, refuse, and dead animals.

Table 13 shows the class of material removed in street cleaning and collection and disposal of garbage, refuse, and dead animals.

Table 14 shows the cost of transportation used in street cleaning, garbage collection, and sprinkling.

COLLECTION AND DISPOSAL OF NIGHT SOIL.

February 1, 1904, the personnel and equipment connected with the collection and disposal of night soil were transferred by the Board of Health and the Insular Purchasing Agent to the city of Manila.

In the city of Manila night soil is collected by means of the pail-conservancy system, the odorless excavators, and the public scavengers.

The pail-conservancy system has been installed in many private houses, public buildings, and nearly all the public closets. It has proved a sanitary measure of considerable benefit to the city of Manila. Wooden pails placed in commodes are used as receptacles for the night soil. After twenty-four hours clean pails are substituted and the pails which have been used are removed, tightly covered, placed on trucks, carried to the steam barge *Pluto*, and there emptied, washed, and disinfected.

The pails are well tarred and painted to prevent the wood from absorbing the foul contents. The covers are attached to the pails with iron

handscrews. Some device for fastening the cover that would take less time and prevent the cover from loosening when the pails are carted over rough roads would be an improvement.

The commodos used are made of cheap material, poorly built, and clumsy to handle. The use of a more suitable pattern made of good material would greatly improve the service.

When this work was taken over by the city of Manila the transportation used for collecting pails consisted of 3 trucks, 7 bull carts, and 4 cascoes. This was reduced to 4 trucks and 2 cascoes on March 1, 1904.

The trucks can carry 116 pails at one time. The cascoes are used for carrying the pails by way of the esteros. This is a cheap mode of transportation, and more cascoes are available for this work when required. Public closets have been erected in districts where they are most needed, and about 470 pails are removed from these daily.

February 22, 1904, the collection of pails during the daytime was discontinued. Since that date all collections have been made during the hours of 8 p. m. to 5 a. m. April 1 the position of superintendent of pail system was abolished.

A reorganization of the force employed in this work allowed the transfer of two foremen to the street-cleaning department and the abolishment of the position of one foreman. All of these foremen were receiving ₱720 per annum.

The force now employed in this work consists of 1 overseer, at ₱2,400 per annum; 1 assistant overseer, at ₱960 per annum; 1 foreman, at ₱720 per annum; 12 subforemen, at ₱1.20 per diem each; 1 subforeman, at ₱1.10 per diem; 80 laborers, at ₱1 per diem each.

Number of pails cleaned from February 1 to June 30, 1904.

Month.	Private houses.	Public buildings.	Public closets.	Provisional installations.	Total.
February -----	22,660	3,196	8,908	3,466	34,230
March -----	24,204	3,338	9,670	3,796	41,008
April -----	23,990	3,685	9,690	3,760	41,125
May -----	24,922	3,937	10,013	3,948	42,820
June -----	24,526	3,903	13,020	826	42,275
Total -----	120,302	18,059	51,301	15,796	205,458

Amount collected for cleaning pails in private houses during five months.

Month.	Philippine currency.	Spanish-Filipino currency.
February -----	1,445.45	311.50
March -----	1,510.92	228.70
April -----	1,980.79	289.14
May -----	1,603.97	145.36
June -----	1,784.75	5.60
Total -----	8,326.08	980.30

The odorless excavators are used for removing the night soil from vaults and cesspools. They consist of 500-gallon tank wagons, pumps, suction hose, etc., especially designed and constructed for performing this work in a sanitary manner without annoyance to the general public.

Vaults cleaned and loads removed during five months.

Month.	Vaults cleaned.	Loads removed.
February	20	253
March	47	267
April	32	257
May	36	332
June	49	327
Total	184	1,486

The following amounts were collected for cleaning vaults in private houses for five months:

February	P75. 06
March	306. 00
April	160. 00
May	50. 00
June	159. 29
Total	750. 35

The contents of vaults and cesspools are also removed by public scavengers, and dry-earth closets in use by the military organization located in Manila have been cleaned by public scavengers. These are licensed contractors, who removed the night soil by means of covered barrels. This method of removing night soil is very unsatisfactory and causes much complaint. Unless the contractors provide themselves with more suitable equipment their licenses should be cancelled. The military dry-earth closets will be replaced by the pail-conservancy system on the 1st of July, 1904.

Night soil removed by public scavengers for five months.

Month.	Permits issued.	Barrels of contents removed from vaults.
February	217	3,421
March	220	2,471
April	240	2,688
May	279	3,082
June	295	3,559
Total	1,251	15,221

When the equipment for disposing of night soil was taken over by this department February 1, 1904, it consisted of the steam barge *Pluto* and seven small cascoes. As the *Pluto* was laid up for repairs, the cascoes

were used for carrying the night soil out in to the bay, where it was emptied. The public scavengers used their own cascoes for this purpose. Owing to the fact that these cascoes were emptied in shallow water within four or five miles of the Tondo beach, the tide washed the night soil up along the shore, which was very disagreeable to residents of that district and a menace to their health. This matter was remedied as soon as the steam barge *Pluto* was repaired and placed in service. By means of this boat the night soil is carried so far away from Manila that the tide does not carry it ashore.

The *Pluto*, which was especially designed and constructed for doing this work, was built by Messrs. Farnham, Boyd & Co., and first placed in service during the month of December, 1903.

It is a seagoing barge of the following dimensions: Length over all, 130 feet; length between perpendiculars, 125 feet; beam, 26 feet; depth molded, 10 feet; draft, maximum, 7 feet; coal capacity, about 50 tons; fresh water capacity, about 40 tons; speed per hour, 10 miles.

The garbage hold is fitted amidships, top of hold extending 2 feet 9 inches above molded depth and constructed of steel plates and angles, capable of holding 240 tons in 16 tanks.

The engine is compound with full set of line pumps; horsepower, 280. There is a pump on deck which pumps 30 tons of water in six and one-half minutes, which is used for washing the tanks and pails when emptied.

The night soil collected in pails, excavators, and barrels is emptied into tanks on board the *Pluto* and the pails and barrels are washed and disinfected.

Every morning the barge steams out into the bay and the tanks are emptied by means of a discharge valve placed in the bottom of each tank.

The collection of night soil in Mariquina is accomplished by means of the pail-conservancy system.

Two hundred pails and commodes are distributed in 131 public closets along the Mariquina River to prevent the possible contamination of the water supply of the city of Manila.

Four bull carts were hired at ₱3 per diem each for collecting pails until July 7, 1904, when they were replaced with one two-horse truck and two bull carts, property of the city of Manila.

The following statement shows pails cleaned during five months:

February	5,700
March	6,070
April	6,000
May	6,200
June	6,000
Total	29,970

The cost of collecting and disposing of night soil is shown in Table No. 15.

PARKS.

Owing to the great call for necessary improvements along the lines of sanitation and the improvement of streets, the park work was compelled to move at a moderate pace and will perhaps continue to do so until some general plan of parking the city is approved by the Municipal Board.

The work performed and expenditure made can be found in Tables Nos. 16, 17, 18, 19, and 20.

CITY CEMETERIES.

Paco and La Loma cemeteries have been maintained and cared for during the year, also some improvements made.

The number of interments, force employed, and material expended, with cost of same, can be found in Table No. 21.

The city purchased during the year in the vicinity of La Loma Cemetery a tract of land containing $125\frac{1}{2}$ acres. By a resolution of the Municipal Board it was dedicated for cemetery purposes and to be known as "Cementerio del Norte." This office received instructions to submit plans and to proceed with the work. Plans were submitted and approved.

Avenues and streets were laid out, trees planted, drains laid, and about 50 acres graded, sections were plotted and instructions received to inter pauper dead in sections 8, 9, and 10 of the pauper field. The first interment was made April 12, 1904.

The number of interments, force employed, work done, and cost of same can be found in Tables Nos. 21 and 22.

LAND TRANSPORTATION.

This branch of the service has improved during the past year, owing to the increased purchase of animals, improved condition of the rolling stock, and better discipline among the men employed.

A new blacksmith shop, built of stone, has been added to stable No. 2 with air connection from the blower at the new crematory, for furnishing the draft for the blacksmith fire. Also a new well-ventilated and sanitary stable, capable of housing sixty head of animals, has been erected at Palomar. Part of the original stable at Palomar was torn down and greatly improved by being built higher. Pony stalls have been placed in the wagon shed at the Intramuros stable, sufficient to stable thirty-four ponies. The floor in the main barn has been taken up and relaid.

Wagon and cart sheds are badly needed and would be a great saving to the rolling stock in general.

Repairs to the rolling stock have been heavy, as most of the carts had to be practically rebuilt. The same is true of the harness, as a good deal of it was old quartermaster harness. Eight single sets of truck harness were made at the city shops for use on the pail trucks, as we did not take over any harness from the Board of Health.

On the 1st of January, 1904, the city purchased all the carromatas, carretelas, harness, and animals assigned for their use by the Insular Purchasing Agent, to wit: Twenty-seven carromatas, 2 carretelas, 29 single sets pony harness, 34 native horses, 1 Australian horse, 1 Chino horse, 1 Chino mule.

On the 1st of February, 1904, we took over from the Board of Health all excavators and trucks belonging to them and in use at that time, also 9 head of American mules and 2 head of American horses.

During May, 1904, the city purchased 10 head of light Australian horses, which have proved to be very satisfactory up to the present date. They seem to stand the climate better than the large Australian stock.

Thirty-nine head of Chino mules have been purchased and tried, with very satisfactory results. In my opinion the only thing against them is that the most of them are rather small for the work they have to do.

Thirty-seven head of Australian horses were purchased in November, 1903, and put to work. So far they have not done very well, owing principally to them not being acclimated and a lack of sufficient allowance of forage, a Government ration not being enough for animals of their size, considering the class of work they perform.

The forage ration for horses and mules is too small for the class of work they have to do. With an increase of ration I think the animals could do more work and stand it better than they do now.

I think that mules are best suited for heavy work in this country, as they seem less liable to disease, and the Filipino drivers can get along with them better than they can with horses.

The department has five Filipinos driving two-horse teams that are doing very well, but the average Filipino can not handle two horses; he does not use judgment in driving.

The majority of American teamsters now in the department is doing very well, but good teamsters are very hard to secure in Manila at the present time. Most of the applicants seem to lack experience in this kind of work.

The operations of this branch of the service and the cost are shown in Tables Nos. 23, 24, 25, 26, 27, and 28.

CLEANING ESTEROS.

During the months of March, April, May, and June this department had charge of a force of laborers employed in cleaning the mud from certain esteros. Four cascoes and 25 laborers were used in this work.

The following table shows the earth removed and the cost:

Month.	Tons of earth removed.	Cascoes in use.	Laborers, at ₱1.20 per diem.	Laborers, at ₱1 per diem.	Cost per month.	Cost per ton.
1904.						
March	686	4	1	24	₱471.20	₱0.58
April	1,255	4	1	24	727.30	.58
May	1,653	4	1	24	770.20	.47
June	1,609	4	1	24	694.60	.43
Total	5,203				2,663.10	.51

Very respectfully,

J. MEHAN,

*Superintendent Street Cleaning,
Collection and Disposal of Refuse.*

The ACTING CITY ENGINEER, Manila, P. I.

TABLE NO. 1.—*Organization of the forces employed and rates of pay per month, per day, and the superficial street area of the city of Manila, by districts.*

Class of labor.	District.								Night work. ¹	Clean- ing gut- ters.	To- tal.	Rate.	
	City.	1.	2.	3.	4.	5.	6.	7.				Per month.	Per day.
Inspector	1										1	₱233.33	
Foreman:													
First class	1										1	100.00	
Second class	1										1	80.00	
Third class		21	1	1	1	1	1				6	70.00	
Fourth class		1							1		2		₱1.50
Fifth class		4	5	2	4	3	5			1	24		1.20
Laborers:													
First class		1	3	2	3	3	2	1	3		18		1.00
Second class		19	26	14	20	17	21	2	7		126		.80
Third class		22	21	4	20	15	25	5	29		6	147	.70
Fourth class		35	47	32	41	40	46	10		25	276		.60
Total	3	83	103	55	89	79	100	18	40	32	602		

¹ On Escolta, Rosario, San Sebastian, Plazas McKinley, Santa Cruz, Goiti, and Binondo.

² Vacant position.

Superficial street area of the city of Manila, by districts.

	Square meters.
No. 1	239,943
No. 2	298,776
No. 3	122,362
No. 4	187,403
No. 5	178,663
No. 6	218,776
No. 7	79,666
Total	1,325,589

TABLE NO. 2.—*Number of square meters cleaned daily by means of brooms, shovels, and hoes.*

District.	Cleaned—			Total area cleaned daily.
	Twice a day.	Threetimes a day.	Four times a day.	
No. 1	210, 298	205, 896	264, 648	680, 842
No. 2	289, 042	462, 765	-----	751, 807
No. 3	208, 808	53, 874	-----	262, 682
No. 4	353, 046	32, 640	-----	385, 686
No. 5	346, 210	16, 674	-----	362, 884
No. 6	437, 552	-----	-----	437, 552
No. 7	159, 332	-----	-----	159, 332
Total	2, 004, 288	771, 849	264, 648	3, 040, 785

TABLE NO. 3.—*Area, in square meters, cleaned two, three, and four times daily, monthly, and for the year.*

Month.	Area in square meters.			Total area cleaned during the year.
	Twice a day.	Three times a day.	Four times a day.	
1903.				
July -----	62, 132, 928	23, 927, 319	8, 204, 088	94, 264, 335
August -----	62, 132, 928	23, 927, 319	8, 204, 088	94, 264, 335
September -----	60, 128, 640	23, 155, 470	7, 939, 440	91, 223, 550
October -----	62, 132, 928	23, 927, 319	8, 204, 088	94, 264, 335
November -----	60, 128, 640	23, 155, 470	7, 939, 440	91, 223, 550
December -----	62, 132, 928	23, 927, 319	8, 204, 088	94, 264, 335
1904.				
January -----	62, 132, 928	23, 927, 319	8, 204, 088	94, 264, 335
February -----	58, 124, 352	22, 383, 621	7, 674, 792	88, 182, 765
March -----	62, 132, 928	23, 927, 319	8, 204, 088	94, 264, 335
April -----	60, 128, 640	23, 155, 470	7, 939, 440	91, 223, 550
May -----	62, 132, 928	23, 927, 319	8, 204, 088	94, 264, 335
June -----	60, 128, 640	23, 155, 470	7, 939, 440	91, 223, 550
Total -----	733, 569, 408	282, 496, 734	96, 861, 168	1, 112, 927, 310

TABLE NO. 4.—*Unit cost of street cleaning per 1,000 square meters monthly and for the year.*

Month.	Number square meters cleaned daily.	Daily average of laborers employed.	Average number square meters cleaned daily.	Cost of cleaning per 1,000 square meters.		
				Superintendence and labor.	Carting.	Total cost.
1903.						
July -----	1, 325, 589	285	4, 651	P0. 212	P0. 028	P0. 240
August -----	1, 325, 589	337	3, 933	.176	.040	.216
September -----	1, 325, 589	335	3, 956	.184	.048	.232
October -----	1, 325, 589	293	4, 524	.148	.048	.196
November -----	1, 325, 589	333	3, 980	.180	.042	.222
December -----	1, 325, 589	355	3, 734	.184	.046	.230
1904.						
January -----	1, 325, 589	315	3, 255	.180	.038	.218
February -----	1, 325, 589	325	4, 078	.178	.030	.208
March -----	1, 325, 589	314	4, 221	.170	.028	.198
April -----	1, 325, 589	327	4, 053	.176	.032	.208
May -----	1, 325, 589	326	4, 066	.180	.046	.226
June -----	1, 325, 589	353	3, 755	.198	.048	.246

Total average cost per 1,000 square meters cleaning ----- P0. 1805

Total average cost per 1,000 square meters carting ----- .0395

Total average cost per 1,000 square meters cleaning and carting ----- .2200

TABLE No. 5.—*Cost of supervision and labor monthly and for the year.*

Month.	Superintendence.		Labor.		Total cost per month.
	Days.	Total cost.	Days.	Total cost.	
1903.					
July-----	970	₹1,609.60	16,970	₹11,408.10	₹13,017.70
August-----	909	1,556.54	15,453	10,247.30	11,803.84
September-----	981	1,652.54	15,049	9,950.00	11,602.54
October-----	1,029	1,703.34	15,594	10,316.60	12,019.94
November-----	979	1,654.14	15,313	10,127.10	11,781.24
December-----	926	1,579.74	15,672	10,374.00	11,953.74
1904.					
January-----	954	1,619.14	15,771	10,441.80	12,060.94
February-----	853	1,515.94	14,718	10,204.50	11,720.44
March-----	1,046	1,729.54	17,001	11,646.40	13,375.94
April-----	1,006	1,700.54	16,631	11,365.55	13,066.09
May-----	1,023	1,709.54	15,802½	10,888.25	12,597.79
June-----	992	1,683.44	16,146	11,051.30	12,734.74
Total-----	11,668	19,714.04	190,120½	128,020.90	147,734.94

TABLE No. 6.—*Area, in square meters, of street surface sprinkled and days that they were sprinkled for each month from July 1, 1903, to June, 30, 1904.*

Month.	Area sprinkled twice a day.			Total, in square meters.	Area sprinkled three times a day.		Sprinkled by sprinkling can, four times a day.	Number of days streets were sprinkled.		
	By hose.	By wagon.	By sprinkling can.		By hose.	By sprinkling can.		By hose.	By wagon.	By sprinkling can.
1903.										
July	421,324	426,090		847,414				19		
August	428,267	432,106		860,373				19		
September	403,840	456,533		860,373				23		
October	404,106	186,754	74,508	665,458				23	20	20
November	408,905	293,577	45,808	748,290				24	20	24
December	232,910	260,274	42,836	536,020				13	12	13
1904.										
January	422,499	411,550	34,889	868,020				27	26	27
February	401,396	464,277	55,543	921,216				28	27	28
March		482,794		482,794	505,250		74,948	30	30	30
April	508,761	475,696		984,457		74,388		28	28	28
May	269,246	583,070		852,316		33,535		28	28	28
June	330,479	526,149		856,628		33,513		20	18	18

TABLE No. 7.—*Total area of street surface sprinkled daily, monthly, and for the year, and the cost per 1,000 square meters.*

[Area is given in square meters.]

Month.	Area sprinkled daily.			Total sprinkled daily.
	By hose.	By wagon.	By sprin- kling can.	
1903.				
July	842,648	852,180		1,694,828
August	856,534	864,212		1,720,746
September	807,680	913,066		1,720,746
October	808,212	373,508	149,196	1,320,916
November	817,810	587,154	91,616	1,496,580
December	665,820	520,548	85,672	1,272,040
1904.				
January	844,998	823,100	69,772	1,737,876
February	802,792	928,554	111,086	1,842,432
March	1,515,750	964,588	299,792	2,780,130
April	1,017,522	951,392	223,014	2,191,928
May	538,492	1,166,140	100,605	1,805,237
June	660,958	1,052,298	100,539	1,813,785

TABLE No. 7.—*Total area of street surface sprinkled daily, etc.—Continued.*

[Area is given in square meters.]

Month.	Area of streets sprinkled monthly.			Total sprinkled monthly.	Average number laborers em- ployed.	Average cost per 1,000 square meters sprin- kled.
	By hose.	By wagon.	By sprin- kling can.			
1903.						
July -----	16, 010, 312	16, 191, 420	-----	32, 201, 732	51	P0. 136
August -----	16, 274, 146	16, 420, 028	-----	32, 694, 174	30	.070
September -----	18, 576, 640	21, 000, 518	-----	39, 577, 158	37	.076
October -----	16, 164, 240	8, 590, 684	2, 983, 920	27, 738, 844	33	.094
November -----	19, 627, 440	11, 743, 080	2, 198, 784	33, 569, 304	39	.110
December -----	8, 655, 660	6, 246, 576	1, 113, 736	16, 015, 972	41	.072
1904.						
January -----	22, 814, 946	21, 400, 600	1, 884, 006	46, 099, 552	43	.114
February -----	22, 478, 171	25, 070, 953	2, 999, 322	50, 548, 451	44	.112
March -----	45, 472, 500	28, 937, 640	8, 993, 760	83, 403, 900	103	.150
April -----	28, 490, 616	26, 648, 976	6, 244, 392	61, 383, 984	99	.180
May -----	15, 077, 776	32, 651, 920	2, 816, 940	50, 546, 636	40	.148
June -----	13, 219, 160	18, 941, 364	1, 809, 702	33, 978, 226	30	.102

Total square meters sprinkled during year	507, 757, 933
Number gallons water used for sprinkling wagon	38, 363, 581
Average number of laborers employed daily	49
Average cost per 1,000 square meters sprinkling	P0. 113

TABLE No. 8.—*Cost of garbage collection from July 1, 1903, to June 30, 1904.*

Month.	Average number of persons employed daily.	Average number of carts employed daily.	Average cost of labor and transportation daily.	Average number cart loads hauled.	Average cost per load hauled.
1903.					
July	163	51	P259.48	548	P0.473
August	120	50	223.18	508	.439
September	113	46	189.74	418	.453
October	117	50	202.08	453	.446
November	117	48	224.20	452	.496
December	118	39	223.22	430	.519
1904.					
January	114	45	208.62	416	.501
February	126	31	228.88	405	.565
March	116	49	234.88	397	.591
April	116	45	228.14	384	.594
May	115	41	206.10	395	.521
June	116	42	218.00	428	.509

Grand average cost per load hauled, P0.508.

The amount of refuse removed in patrolling esteros and the cost of removing the same for period January 1 to June 30 is as follows:

Banca loads of refuse hauled	287
Cart loads of refuse hauled	861
Total cost of labor	P400.40
Average cost per cart load	P0.464

TABLE No. 9.—Total number of loads dumped on city dumps, and where located.

Place.	Cart loads.	Place.	Cart loads.
Maestranza.....	510	Tortuosa.....	20
Crematories.....	60,525	Nagtahan.....	4,637
Parks.....	8,639	San Anton.....	3,496
Vidal.....	616	Luneta.....	453
Barrio Concepcion.....	17,022	Bambang.....	494
Sande.....	10,635	Paco police station.....	1,670
Pretil.....	9,333	Privado Street.....	186
Corral No. 2.....	27,804	Singalong.....	329
Meisie.....	5,991	Nozaleda.....	230
Cervantes, National Theater.....	4,966	Paco Cemetery.....	17
Cervantes Street.....	30,561	Real, Paco.....	439
Gagalangin.....	1,114	187 Calle Divisoria.....	85
Morga.....	5,805	16 Lamayan.....	462
Lemery.....	4,079	Pena Francia.....	564
Moriones.....	1,926	San Antonio Abad.....	2,583
Lico.....	376	San Rafael.....	26,688
Santa Monica.....	427	San Luis.....	2,148
Pavia.....	253	San Antonio, Paco.....	3,937
Solis.....	198	Santa Ana.....	896
Arranque.....	758	San Andres, Malate.....	14,976
Iris.....	2,481	Santo Sepulcro.....	6,835
Bilibid.....	332	San Roque, Malate.....	467
San Lazaro.....	826		
Malacanan.....	1,443	Total.....	268,782

TABLE No. 10.—Daily average of cart loads and tons of house garbage disposed of at the city crematories, with cost of disposing of same per ton, for period January 1 to June 30, 1904.

Month.	Number of loads burned.	Tons of garbage burned.	Daily average of labor employed.	Cost per ton of garbage disposal. ¹		
				Superintendence and labor.	Material expended.	Total cost.
1904.						
January.....	170	85	61	₱0.962	₱0.798	₱1.760
February.....	176	88	50	.636	.438	1.074
March.....	220	115	71	3.750	.486	1.236
April.....	179	89	67	3.888	.338	1.226
May.....	108	54	55	31.268	.570	1.838
June.....	117	58	55	41.630	1.000	2.630

¹This includes trade refuse, organic matter, slop, and market refuse.

²Five of the men who worked at Santa Cruz Crematory were taken from the street gutter cleaning. Their cost is not charged in this table.

³The coal used at Santa Cruz Crematory was taken from Palomar Crematory. Laborers employed properly belong to Paco Crematory.

⁴The coal used at Palomar Crematory was taken from Paco Crematory, and laborers employed at Santa Cruz Crematory were taken from Paco Crematory.

Grand total average cost per ton, ₱1.627.

TABLE No. 11.—Number of animals disposed of at city crematories from July 1, 1903, to June 30, 1904.

Animals.	Number.	Animals.	Number.
American horses.....	238	Deer.....	29
Australian horses.....	47	Cats.....	1,470
Chino horses.....	34	Rabbits.....	8
Filipino horses.....	1,263	Rats.....	183,027
American mules.....	49	Monkeys.....	37
China mules.....	14	Domestic birds.....	643
Cows.....	734	Calves.....	106
Dogs.....	2,141	Fowls.....	9,693
Carabaos.....	563	Snake.....	1
Hogs.....	10	Turtles.....	22
Pigs.....	3,907		
Goats.....	111	Total.....	204,150
Sheep.....	23		

The number of cart loads of material removed in the city of Manila by department carts and disposed of at city crematories is as follows:

House garbage.....	50,844
Trade refuse.....	3,454
Market refuse.....	2,237
Slop.....	2,944
Organic matter.....	745
Condemned goods.....	2
Coal for crematories.....	222
Wood.....	17
Dead animals.....	60
Total.....	60,525

In addition to the above the following loads of matter were delivered to crematories by military and private firms:

Organic matter.....	379
Condemned goods.....	1,472
Oranges and wooden boxes.....	1
Bacon.....	3
Jam.....	1
Tobacco.....	1
Vegetables.....	2
Lemons.....	1
Flour.....	1
Potatoes.....	1
Slop.....	2,765
Manure.....	170
Trade refuse.....	5
Total.....	4,202

Total loads delivered by districts..... 60,525

Total loads delivered by military, etc..... 4,202

Grand total loads cremated..... 64,727

Force report.

Class of labor.	Crematories.			Total.	Rate per month.	Rate per day.	Total number of days.	Total cost.
	Palo-mar.	Paco.	Santa Cruz.					
Foreman.....	1			1	₱170.00		122	₱680.00
Do.....	1			1		₱4.66	329	1,585.86
Assistant foreman.....	1			1		1.50	133	199.50
Fifth-class foreman.....	2	2	1	5		1.20	1,195	1,434.00
Mechanic.....	1			1	60.00		152	300.00
Do.....	1			1	40.00		30	40.00
Fireman.....	2	2	1	5		1.20	145½	1,741.80
First-class laborer.....	28	11	2	41		1.00	12,790	12,790.00
Second-class laborer.....	3	7		10		.80	2,868	2,294.40
Third-class laborer.....	1	2	2	5		.70	908	635.60
Total.....								21,701.16

Material expended.

1,035 tons Australian coal.....	₱15,319.02
84 gallons mineral oil.....	47.40
102 gallons carbolic acid.....	56.14

Material expended—Continued.

18 gallons engine oil	P28.58
7 gallons cylinder oil	21.30
18 pounds linseed oil	5.20
63 pounds vacuum oil	93.80
9 pounds soap	8.12
39 pounds cotton waste	10.92
1 barrel cement, Portland	9.18
1 barrel lime	8.20
Total	15,607.86

RECAPITULATION.

Total cost of labor	21,701.16
Total cost of material expended	15,607.86
Total	37,309.02

TABLE NO. 12.—*Number of cart loads of materials removed in the city of Manila monthly and for the year.*

Month.	District.							Night work.	Total cart loads.
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.		
1903.									
July	1,964	4,763	2,206	4,758	3,139	3,364	240	352	20,786
August	2,392	4,814	2,406	5,375	3,241	3,785	294	460	22,767
September	2,794	5,683	2,288	5,452	3,351	3,609	349	370	23,896
October	3,095	6,463	2,840	6,190	3,448	4,186	289	397	26,908
November	2,758	5,890	2,452	5,500	3,755	3,705	341	335	24,736
December	3,012	5,631	2,586	5,617	3,941	3,983	413	309	25,474
1904.									
January	2,550	4,653	2,293	4,992	3,191	3,406	348	316	21,749
February	2,367	4,330	2,182	4,215	3,011	3,001	373	270	19,749
March	2,578	4,588	2,226	3,921	3,129	3,233	331	282	20,288
April	2,547	3,831	2,070	3,996	2,927	3,133	358	259	19,121
May	2,974	4,654	2,186	4,411	3,130	3,548	300	243	21,446
June	2,743	4,856	2,121	4,501	3,215	3,693	441	292	21,862
Total	31,774	60,156	27,838	58,928	39,478	42,646	4,077	3,885	268,782

TABLE NO. 13.—*Classification of material removed in the city of Manila from July 1, 1903, to June 30, 1904.*

Classification and disposition.	Cart loads.	Classification and disposition.	Cart loads.
Classification:		Classification—Continued.	
House garbage	50,844	Cinders	1,045
Trade refuse	3,454	Sand	66
Market refuse	2,237	Broken stone	777
Rubbish	14,427	Pavement stone	34
Slop	2,944	China stone	46
Organic matter	745	Guadalupe stone	16
Condemned goods	2	Bricks	5
Street sweepings	48,712	Lime	7
Beach refuse	8,671	Wood	17
Manure	63,395	Dead animals	60
Fertilizer	515		
Sod	160	Total	268,782
Hemp	8		
Old sacks	2	Disposition:	
Lead and worn iron	2	Delivered to—	
Nipa	7	Scow	510
Shavings	5	Crematories	60,525
Earth	65,137	Parks	8,639
Street mud	4,332	Suburbs	199,108
Escombro	888		
Coal for crematory	222	Total	268,782

TABLE No. 14.—*Cost of transportation used in street cleaning, garbage collection, and sprinkling from July 1, 1903, to June 30, 1904.*

Month.	Sprinkling wagons.	Two-horse wagons.	Dump carts.	Bull carts.	Cost.				Total cost.
					Sprinkling wagons.	Two-horse wagons.	Dump carts.	Bull carts.	
1903.									
July	196	1	2, 198		P1, 493. 52	P6. 98	P5, 495. 00		P6, 995. 50
August	193		2, 295½		1, 470. 66		5, 738. 75		7, 209. 41
September	172		2, 272½		1, 310. 64		5, 681. 25		6, 991. 89
October	106		2, 360	31	807. 72		5, 900. 00	P69. 75	6, 777. 47
November	183		2, 168	30	1, 394. 46		5, 420. 00	67. 50	6, 881. 96
December	115		2, 274½	31	876. 30		5, 686. 25	77. 50	6, 640. 05
1904.									
January	271		2, 016	31	2, 065. 02		5, 040. 00	77. 50	7, 182. 52
February	281		1, 846	29	2, 101. 22		4, 615. 00	72. 50	6, 788. 72
March	338		1, 935½	31	2, 575. 56		4, 838. 75	77. 50	7, 491. 81
April	323		1, 901½	30	3, 126. 64		4, 677. 69	75. 00	7, 879. 53
May	376	1	2, 045½	31	3, 639. 68	9. 14	5, 030. 93	77. 50	8, 757. 25
June	234		2, 073		2, 265. 12		5, 099. 58		7, 364. 70
Total	2, 788	2	25, 386	244	23, 126. 54	16. 12	63, 223. 20	594. 75	86, 960. 61

TABLE No. 15.—*Cost of collecting and disposing of night soil for five months ended June 30, 1904.*

Month.	Supervision, collection of funds, and general office work.	Pail-conveyance system.	Odorless excavator.	Guarding and cleaning public closets.	Steam barge Pluto.	Mariquina.	Total.
February.....	P1, 142. 54	P3, 272. 08	P875. 80	P381. 80	P1, 510. 06	P808. 00	P9, 390. 88
March.....	1, 180. 74	4, 792. 34	1, 313. 80	434. 28	1, 841. 72	861. 40	10, 424. 28
April.....	887. 34	4, 298. 80	1, 310. 80	429. 00	1, 726. 00	834. 00	9, 485. 94
May.....	813. 34	4, 280. 04	1, 360. 00	369. 60	1, 761. 54	875. 40	9, 459. 92
June.....	1200. 00	4, 264. 67	1, 457. 60	380. 00	1, 533. 16	658. 56	8, 497. 99
Total.....	4, 223. 96	20, 907. 93	6, 318. 00	1, 994. 68	8, 372. 48	4, 037. 36	47, 259. 01

¹Supervision only.

TABLE No. 16.—*Amount of work accomplished in the city parks for the fiscal year ended June 30, 1904.*

Place of employment.	Area cleaned.	Area mowed.	Area watered.	Area graded.	Area sodded.	Area sod cut.	Area building walks.
	<i>Square meters.</i>	<i>Square meters.</i>	<i>Square meters.</i>	<i>Square meters.</i>	<i>Square meters.</i>	<i>Square meters.</i>	
Luneta and Legaspi.....	2, 440, 423	1, 289, 921	7, 925, 613	14, 589	-----	-----	-----
Ayuntamiento.....	1, 010, 094	65, 813	553, 475	284	284	-----	-----
San Juan de Letran.....	88, 572	6, 292	26, 762	-----	-----	-----	-----
Santo Tomas.....	213, 927	30, 632	143, 314	-----	-----	-----	-----
Santa Potenciana.....	219, 600	-----	-----	-----	-----	-----	-----
Sampalucan.....	245, 598	17, 142	87, 727	-----	-----	-----	-----
Plaza de España.....	126, 220	14, 985	71, 040	42	42	-----	-----
Municipal School.....	1, 392, 276	24, 528	-----	-----	-----	-----	-----
Magallanes Park.....	457, 334	95, 305	157, 393	-----	-----	-----	-----
Oriente.....	1, 746, 295	85, 104	666, 493	1, 579	91	-----	1, 438
San Gabriel.....	132, 492	10, 860	48, 870	34	34	-----	-----
San Sebastian.....	178, 930	-----	-----	-----	-----	-----	-----
Ermita.....	192, 516	14, 314	66, 280	-----	-----	-----	-----
Plaza de Gracia.....	146, 400	10, 744	50, 320	-----	-----	-----	-----
Malate.....	231, 265	3, 561	85, 693	-----	-----	-----	-----
Malacañan.....	1, 548, 180	105, 977	610, 000	10, 320	4, 503	-----	1, 159
Botanical Garden.....	14, 040, 973	1, 007, 396	3, 624, 379	19, 901	7, 807	-----	2, 083
Plaza de Lawton.....	347, 040	347, 040	476, 917	-----	-----	-----	-----

TABLE No. 16.—*Amount of work accomplished, etc.*—Continued.

Place of employment.	Area cleaned.	Area mowed.	Area watered.	Area graded.	Area sodded.	Area sod cut.	Area building walks.
	<i>Square meters.</i>	<i>Square meters.</i>	<i>Square meters.</i>	<i>Square meters.</i>	<i>Square meters.</i>	<i>Square meters.</i>	
City Hall.....	205,511	25,630		1,692	1,692		
Vidal and Malecon.....	13,933,375	34,395	104,190				
Parian and Real gates.....	146,684	146,449					
Arroceros and others.....	1,583,388	51,198		2,193	2,193		
Camp Wallace ¹				4,890			1,360
San Fernando ²				252	223		29
Glacis, Remonta, and San Andres ³						16,869	
San Antonio Abad and San Rafael ⁴							
Different places.....							
Total.....	40,627,093	3,387,286	14,698,466	55,776	16,869	16,869	6,069

Place of employment.	Digging trench.	Cement tubes laid.	Cement curbs laid.	Drains laid.	Fountain repaired.	Bars painted.	Tubs painted.	Seed planted.	Trees planted.
	<i>Linear meters.</i>	<i>Linear meters.</i>	<i>Linear meters.</i>						
Luneta and Legaspi.....									2
Ayuntamiento.....					5				
San Juan de Letran.....					1				
Santo Tomas.....					2	4			
Santa Potenciana.....					1				
Sampalucan.....									
Plaza de España.....									
Municipal School.....									
Magallanes Park.....									
Oriente.....					1				
San Gabriel ¹					1				
San Sebastian.....								7	
Ermita.....									
Plaza de Gracia.....					1				
Malate.....					2	4		14	
Malacañan.....	72	72		6					
Botanical Garden.....	352	20	332	16	1		450	3,467	15
Plaza de Lawton.....									6
City Hall.....									33
Vidal and Malecon.....					1				4
Parian and Real gates.....									
Arroceros and others.....									
Camp Wallace ¹									11
San Fernando ²									3
Glacis, Remonta, and San Andres ³									
San Antonio Abad and San Rafael ⁴									
Different places.....									
Total.....	424	92	332	22	16	8	450	3,513	74

Place of employment.	Trees transplanted.	Trees trimmed.	Trees cared for.	Plants planted.	Plants transplanted.	Plants cared for.	Plants potted.	Plants tubbed.	Mowers sharpened.
Luneta and Legaspi.....			3			160			15
Ayuntamiento.....		86	73	187		764			2
San Juan de Letran.....			6						
Santo Tomas.....			38			121			
Santa Potenciana.....			40			166			
Sampalucan.....		7	8						
Plaza de España.....		2	3						
Municipal School.....		16	43			26			
Magallanes Park.....		28	60			73			
Oriente.....		28	86	96		26			1
San Gabriel.....		13	13						
San Sebastian.....			12						
Ermita.....		10	10			81			
Plaza de Gracia.....			9			40			

¹ Digging stones and leveling ground.² Excavating and filling low grounds.³ Excavation.⁴ Screening refuse for parks.

TABLE No. 16.—*Amount of work accomplished, etc.—Continued.*

Place of employment.	Trees trans-plant-ed.	Trees trimmed.	Trees cared for.	Plants plant-ed.	Plants trans-plant-ed.	Plants cared for.	Plants potted.	Plants tubbed.	Mowers sharp-ned.
Malate		14	11			35			
Malacañan	10	87	102	543	31	620			2
Botanical Garden	212	334	736	561	1,904	7,677	334	110	19
Plaza de Lawton		2	14						
City Hall			23	112		112			
Vidal and Malecon	18	749	713						
Parian and Real gates		45	39						
Arroceros and others		60	40	58					
Camp Wallace ¹									
San Fernando ²									
Glacis, Remonta, and San Andres ³									
San Antonio Abad and San Rafael ⁴									
Different places		556							
Total	240	2,037	2,082	1,557	1,935	9,901	334	110	39

¹ Digging stones and leveling ground.² Excavating and filling low grounds.³ Excavation.⁴ Screening refuse for parks.TABLE No. 17.—*Cost of force employed and transportation used at the city parks during the fiscal year ended June 30, 1904.*

Class of labor.	Num-ber.	Rate per day.	Number of days.	Total cost.
Overseer	1	P200.00	61	P400.00
Second-class foreman	1	80.00	335	880.00
Third-class foremen	2	170.00	395	910.00
Fourth-class foremen	2	150.00	306	500.00
Fifth-class foremen	2	1.50	364	546.00
Foremen	2	1.20	437	524.40
Masons	1	1.60	151	241.60
Do	2	1.50	436	654.00
Do	2	1.20	92	110.40
Do	1	1.00	6	6.00
Carpenter	1	1.20	155	186.00
Gardeners	5	1.20	144	532.80
Do	5	1.00	1,520	1,520.00
First-class laborers	5	1.00	1,031	1,031.00
Second-class laborers	10	.80	3,487	2,789.60
Third-class laborers	20	.70	6,951	4,865.70
Fourth-class laborers	162	.60	27,800	16,680.00
Watchman	1	2.40	85	204.00
Total				32,581.50

Transportation.	Number of days.	Rate per day.	Total cost.
Bull carts	22½	P2.00	P443.00
Do	119	2.25	267.75
Do	1,836½	2.50	4,591.25
Do	283½	2.60	737.10
Dump carts	85	3.50	297.50
Do	1,996½	2.50	4,991.25
Do	1,001	2.46	2,462.46
Total			13,790.31

¹ Per month.

TABLE NO. 18.—*Number of cart loads of material hauled by the carts at work in the city parks during one year.*

Material.	Cart loads.	Material.	Cart loads.
Pavement stones	312	Lumber	18
Broken stone	184	Bricks	10
Guadalupe stones	249	Dry grass	4
Gravel	189	Bamboo	56
Earth	21,059	Fertilizer	5,804
Plants	426	Trees	128
Cocoanut palms	4	Cement tubes	5
Sand	11,657	Weeds	11
Cement in barrels	12	Mud	153
Sod	3,182	Refuse	6
Escombro	271	Old cannon	1
Dirt	695		
Cement curbs	19	Total	46,097
Cinders	1,642		

TABLE NO. 19.—*Cost of materials expended at the city parks from July 1, 1903, to June 30, 1904.*

Article.	Amount.	Total cost.	Article.	Amount.	Total cost.
Rice	30½	₱158.74	Picks	2	₱1.58
Oats	4,265 pounds	139.84	Small hand saws	6	19.20
Hay	1,950 do	124.16	Blocks with chain	2	48.00
Nails	59 do	11.80	Axes	6	4.56
Paint:			Screens for gravel	6	60.00
Green	112½ do	39.42	Watering pots	16	20.20
Black	10 do	2.00	Lanterns	5	6.14
Rope	104 do	51.72	Padlocks	5	3.90
Copper wire	11 do	3.52	Record book	1	1.16
Soap	12 do	1.32	Storm flags	4	16.40
Cord, ½ inch	7 do		Brushes	14	9.70
Cement:		14.00	House brooms	21	9.00
Curbs	332	637.44	Bricks, red	350	9.40
Tubes, 15 centimeter	109	165.93	American brooms	2	1.08
Mineral oil	175 gallons	80.92	Native brooms	700	13.92
Tar paint	5 do	.76	Bolts:		
Turpentine	3 do	1.92	2 by ½ inch	100	1.80
Linseed oil	5 do	11.00	3 by ½ inch	100	2.00
Cocoanut oil	3½ do	4.20	Cement	44 barrels	203.72
Japan dryer	1 do	2.00	Lime	3 do	14.40
Lawn mowers	18	279.00	Wicks	6 feet	.16
Bolos	16	16.00	Hose:		
Shovels	5	7.30	2½ inch	1,848 do	590.28
Pruning scissors	17	68.00	1 inch	1,050 do	191.10
Catch-basin covers	14	99.12			
Sickles	12	11.40	Total		3,159.21

TABLE NO. 20.—*Cost of maintenance of city parks.*

Name of park.	Cost.	Name of park.	Cost.
Luneta and Legaspi	₱2,997.70	Malacañan	₱4,513.10
Ayuntamiento	368.10	Botanical Gardens	14,088.05
San Juan de Letran	58.90	Plaza de Lawton	350.70
Santo Tomas	117.85	San Antonio Abad and San Rafael	1,273.30
Santa Potenciana	43.15	City Hall	387.50
Sampalucan	114.30	Glacis, Remonta, and San Andres	2,196.90
Plaza de España	114.90	Vidal and Malecon	1,399.60
Municipal School	110.90	San Fernando	96.80
Magallanes Park	199.55	Parian and Real gates	507.00
Oriente	517.00	Camp Wallace	1,320.70
San Gabriel	205.10	Arroceros and others	728.50
San Sebastian	57.00	Different places	428.10
Ermita	141.10		
Plaza de Gracia	98.80	Total	32,581.50
Malate	146.20		

TABLE No. 21.—*Number of interments in North, La Loma, and Paco cemeteries from July 1, 1903, to June 30, 1904.*

Month.	North Cemetery.		Loma Cemetery.		Paco Cemetery.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
1903.							
July.....			191	154	11	14	370
August.....			348	222	16	8	594
September.....			395	225	20	14	754
October.....			444	290	21	21	776
November.....			364	272	19	6	661
December.....			270	311	12	10	1 604
1904.							
January.....			279	217	10	12	518
February.....			252	189	12	19	472
March.....			302	212	15	12	541
April.....	32	11	320	174	16	10	563
May.....	59	12	320	174	8	10	583
June.....	50	10	258	198	13	13	542
Total.....	141	33	3, 743	2, 738	173	149	6, 978

¹Including 1 stillborn.*Force report.*

Labor.	Cemetery.			Total.	Rate per month.	Rate per diem.	Total days.	Total cost.
	Paco.	La Loma.	Norte.					
Superintendent.....			1	1	P150.00		61	P300.00
Assistant superintendent.....	1	1		2	60.00		732	1, 440.00
Foreman.....			1	1		P5.00	173	865.00
Assistant foremen.....			1	1		4.00	9	36.00
Fifth-class foremen.....		1	2	3		1.20	609	730.80
First-class laborers.....	7	28	77	112		1.00	27, 554	27, 554.00
Second-class laborers.....	3			3		0.80	910	728.00
Total.....	11	30	82	123			30, 048	31, 653.80

Cost of materials furnished during year.

18 meters of sand.....	P54.00
54 barrels of lime.....	248.34
2 bolos.....	2.00
8 pounds rope, $\frac{1}{8}$ inch.....	16.00
1,250 bricks.....	30.74
10 hoes.....	6.60
10 sickles.....	10.00
50 native brooms.....	3.00
7 barrels cement, Portland.....	36.26
Total.....	406.94

TABLE No. 22.—*Work performed and cost of transportation used at Cementerio del Norte from November, 1903, to June 30, 1904.*

Cutting grass, shaping, etc.....	square meters.....	222, 000
Sodded.....	do.....	425
Drains dug.....	cubic meters.....	198
Filling.....	do.....	32, 530
Excavating.....	do.....	42, 676
Transported by carts.....	do.....	511
Trees planted.....	number.....	39
Graves dug.....	do.....	174

TABLE No. 22.—Work performed and cost of transportation, etc.—Continued.

Transportation.

Bull carts, 103½ days, at ₱2.50	₱258.75
Wagon, 15 days, at ₱6.96	104.40
Dump carts, 10 days, at ₱2.46	24.60
Total cost of transportation	387.75

TABLE No. 23.—Number of animals on hand during year.

Month.	On hand.					Received.					Total.	Died.				Destroyed.			Total.
	American horses.	Australian horses.	Mules.	Chino horses.	Native horses.	American horses.	Australian horses.	Native horses.	Chino horses.	Mules.		American horses.	Australian horses.	Mules.	Chino horses.	American horses.	Native horses.	Mules.	
1903.																			
July.....	134	---	45	5	4	---	---	---	---	39	227	---	---	---	---	1	---	---	226
August.....	133	---	84	5	4	---	---	---	---	---	226	1	---	---	---	---	---	---	225
September.....	132	---	84	5	4	1	---	---	---	---	226	1	---	---	---	2	---	---	223
October.....	130	---	84	5	4	---	---	---	---	---	223	1	---	1	---	---	---	1	219
November.....	129	---	82	5	4	9	---	---	---	---	229	3	---	---	---	7	---	---	218
December.....	128	---	81	5	4	28	---	---	---	---	246	1	---	---	---	---	---	---	245
1904.																			
January.....	155	---	81	5	4	3	---	34	1	1	284	1	---	---	---	1	---	---	1274
February.....	150	---	81	5	38	2	---	---	---	9	285	---	---	1	---	1	---	---	283
March.....	151	---	89	5	38	---	---	---	---	---	283	2	---	2	---	1	---	---	278
April.....	148	---	87	5	38	---	---	---	---	---	278	---	---	---	---	1	1	1	275
May.....	106	41	86	5	37	---	10	---	---	---	285	1	1	---	1	---	---	---	283
June.....	105	50	86	5	37	---	---	---	---	---	283	2	---	---	1	---	---	---	280

¹⁵ American and 1 Chino horses and 1 mule were sold at public auction January 6, 1904, and 1 American horse was transferred to Police Department. These animals are not mentioned in the losses for January.

TABLE No. 24.—Average daily distribution of animals.

Month.	Collection of garbage.	Street building.	Collection of night soil.	Street cleaning.	Street sprinkling.	City parks.	Water Department.	Surveyors.	Sheriff's office.	Police Department.	City Schools.	Department Assessments and Collections.	Cemeteries.	Municipal Board.
1903.														
July.....	---	50	---	71	30	---	3	---	---	---	---	---	---	---
August.....	---	53	---	72	33	---	4	6	---	2	---	---	---	---
September.....	---	49	---	75	33	4	6	5	---	---	---	---	---	---
October.....	---	66	---	77	12	7	8	5	---	1	---	---	---	---
November.....	---	63	---	77	18	12	6	7	---	---	---	---	---	---
December.....	---	67	---	78	16	14	6	10	---	---	---	---	---	---
1904.														
January.....	---	64	---	75	26	18	7	8	6	6	6	5	---	3
February.....	---	63	26	71	29	16	5	8	6	4	6	5	---	3
March.....	57	45	26	31	32	16	8	9	6	4	5	4	---	3
April.....	44	38	30	34	26	16	8	7	7	4	6	4	---	3
May.....	44	42	31	34	28	16	8	7	4	4	4	4	---	3
June.....	46	40	32	29	19	15	8	9	5	4	4	4	3	3

TABLE No. 24.—Average daily distribution of animals—Continued.

Month.	Parian Court.	City Attorney.	Prosecuting Attorney.	New sewer system.	City Engineer.	Disbursing officer.	Detective Bureau.	Building department.	City shops.	Fire Department.	Serviceable.	In hospital.	In stables.
1903.													
July					1				3		165	57	
August					1	2		3	5	1	194	27	12
September	1			1	1	1		3	2		193	30	12
October	1			1	1	1		6			195	22	9
November				1	1			5	2		198	18	6
December				1	1			5	2		207	19	26
1904.													
January				1	1								
February	2	1	1	1	1		1	5			211	20	18
March	2	1	2	1	1		1	6			249	12	13
April		2	2	1	1		1	5			260	18	14
May		2	2	2	1		1	6			255	20	14
June	2	1	2	2	1	1	1	5		1	258	26	15
	2			1				5				20	22
Daily average in stables													14
Daily average serviceable													234
Daily average unserviceable													24

TABLE No. 25.—Force employed, and cost of same.

Employees:

1 veterinarian	per month	£250. 00
1 foreman	do	200. 00
1 foreman	do	180. 00
1 blacksmith	do	180. 00
1 foreman	do	166. 00
1 clerk	do	150. 00
17 teamsters	do	140. 00
20 teamsters	do	120. 00
2 watchmen	do	120. 00
5 teamsters	do	50. 00
1 assistant foreman	do	50. 00
1 blacksmith	do	50. 00
1 blacksmith	do	48. 00
115 drivers	per day	1. 35
41 drivers	do	1. 00
62 laborers	do	. 80

Total cost:

July, 1903	10, 973. 06
August, 1903	10, 888. 80
September, 1903	10, 260. 00
October, 1903	9, 853. 82
November, 1903	10, 128. 08
December, 1903	11, 037. 42
January, 1904	11, 442. 06
February, 1904	12, 263. 00
March, 1904	13, 055. 06

TABLE NO. 25.—*Force employed, and cost of same*—Continued.

Total cost—Continued.

April, 1904	P13,092.26
May, 1904	13,126.16
June, 1904	12,804.56
Total	<u>138,924.28</u>

Cost of repairs and improvements charged to the various branches of the service:

City stables	13,514.79
Garbage collection	4,862.64
Street cleaning	2,243.58
Street sprinkling	3,564.44
Veterinary hospital	2,332.16
Collection of night soil	1,182.23
City parks	415.65
Cemeteries	400.00
Total cost	<u>28,515.49</u>

TABLE NO. 26.—*Daily average cost of maintaining animals, wagons, carts, harness, etc.*

Shoeing horse or mule	P0.02
Shoeing native pony .....	.01
Forage for 1 American horse .....	.92
Forage for 1 mule or Chino pony .....	.74
Forage for 1 native pony .....	.56
1 American teamster, class 1	4.67
1 American teamster, class 2	4.00
1 native teamster, class 1	1.67
1 native teamster, class 2	1.35
1 native teamster, class 3	1.00
Repairs to 1 truck .....	.18
Repairs to 1 excavator .....	.18
Repairs to 1 sprinkler .....	.18
Repairs to 1 escort or rock-bed wagon .....	.12
Repairs to 1 spring wagon .....	.10
Repairs to 1 dump cart .....	.08
Repairs to 1 carretela .....	.02
Repairs to 1 carromata .....	.02
Repairs to single-set truck harness .....	.06
Repairs to single-set escort harness .....	.06
Repairs to dump-cart harness .....	.04
Repairs to pony harness .....	.02
Truck, American driver, laborer, and 2 horses	7.80
Truck, American driver, laborer, and 4 horses	9.64
Excavator, American driver, laborer, and 2 horses	7.80
Excavator, American driver, laborer, and 4 horses	9.64
Sprinkler, American driver, laborer, and 2 horses	7.60
Sprinkler, American driver, laborer, and 4 horses	9.44
Escort wagon, American driver, 2 horses	6.12
Dump cart, native driver, 1 horse	2.39
Dump cart, native driver, 1 mule	2.21
Carretela, native driver, 1 mule	1.80
Carromata, native driver, 1 pony	1.60

TABLE NO. 27.—*Number of animals shod, and cost of same.*

Month.	Horses.	Mules.	Ponies.	Value of labor.	Value of material.
1903.					
July.....	147	64	5	₹400.00	₹80.5356
August.....	133	81	9	370.00	76.552
September.....	185	101	8	402.00	99.76
October.....	160	80	7	340.00	79.04
November.....	189	90	5	393.30	96.90
December.....	185	111	7	418.14	96.96
1904.					
January.....	182	96	41	429.94	100.16
February.....	143	86	24	321.54	75.82
March.....	156	95	43	393.72	106.08
April.....	177	92	42	429.18	111.96
May.....	175	115	39	450.02	118.44
June.....	184	118	43	476.10	124.20
Total.....	2,016	1,129	273	4,823.94	1,166.6076

Total number animals shod, 3,418; total cost for shoeing, ₹5,990.5476.

TABLE NO. 28.—*Number of pounds of forage issued and cost of same during the fiscal year ended June 30, 1904.*

Month.	On hand.			Received during month.		
	Hay.	Oats.	Straw.	Hay.	Oats.	Straw.
1903.						
July.....	85,698	742	-----	43,095	58,176	-----
August.....	24,276	-----	-----	144,241	50,182	-----
September.....	-----	-----	-----	98,834	54,976	-----
October.....	-----	-----	-----	99,019	92,600	-----
November.....	-----	-----	-----	51,223	37,429	15,846
December.....	9,350	6,468	9,177	82,686	98,425	8,340
1904.						
January.....	13,906	13,760	4,795	90,744	105,534	18,765
February.....	1,400	-----	-----	104,026	88,907	8,340
March.....	15,269	11,640	19,591	105,927	83,145	25,008
April.....	12,986	7,449	3,000	104,829	86,970	23,408
May.....	6,478	4,418	3,000	100,637	86,078	11,776
June.....	2,112	2,142	-----	107,262	87,848	1,876
Total.....	174,475	46,019	39,563	1,132,523	930,270	113,359

Month.	Expended.			Cost of forage for month.			Total cost.
	Hay.	Oats.	Straw.	Hay.	Oats.	Straw.	
1903.							
July	106,377	64,004	-----	₹3,329.36	₹1,801.02	-----	₹5,130.38
August	125,473	77,550	-----	4,615.70	1,605.82	-----	6,221.52
September	90,221	75,750	-----	2,904.80	2,272.50	-----	5,177.30
October	99,019	92,600	-----	3,168.60	2,963.20	-----	6,131.80
November	51,223	37,429	15,846	1,639.14	1,197.72	₹316.92	3,153.78
December	82,686	98,425	17,517	2,657.96	3,149.60	166.80	5,974.36
1904.							
January	90,744	105,534	18,765	2,903.80	3,377.10	375.30	6,656.20
February	104,622	89,052	8,340	3,728.92	2,845.02	166.80	6,740.74
March	106,115	83,145	25,008	3,813.36	3,268.24	280.16	7,361.76
April	104,829	86,970	23,408	3,847.22	3,147.34	234.08	7,228.64
May	100,637	86,078	11,776	2,693.36	3,116.02	117.76	5,927.14
June	107,262	87,848	1,876	2,657.64	8,224.02	18.76	6,900.42
Total	1,167,208	984,385	122,536	38,959.86	31,967.60	1,676.58	72,604.04

REPORT OF SUPERINTENDENT OF WATER SUPPLY AND SEWERS.

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS,

Manila, P. I., August 29, 1904.

SIR: I have the honor to forward you herewith the annual report for the office of water supply and sewers for the fiscal year 1904.

STORM-WATER DRAINAGE.

GENERAL OBSERVATIONS.

The problem of an adequate storm-water drainage system has never been fully considered. Such observations as were made by the Spanish engineers were more or less disconnected and did not determine any point with certainty. It is unquestionable that the removal of storm water must be undertaken in drains entirely distinct from the sewage carriers and that the water courses must be utilized in the design of the system. The solution of the problem is greatly simplified by the small drainage areas and short leads to the esteros, but is much complicated by the small gradients encountered. Before a definite design may be determined upon for all districts, observations on estero flow and ground-water levels must be taken and the results tabulated and gaugings of streams and present sewer recorded for the definite determination of the absorption and run-off coefficients. The records of the Weather Bureau must be redrawn to make them more than passably valuable in this work. Auxiliary rain gauges should be set up in Tondo and Sampaloc to obtain more definite knowledge of the intensity of rainfall as the local conditions are apparently quite different there than as observed at the station in Ermita.

DETERMINATION OF MINIMUM ELEVATION OF OUTFALLS.

Close studies of the tide tables prepared by the United States Coast and Geodetic Survey indicate that minimum low tide of 10 meters city datum, equal to 30 feet sewer datum (mean lower low water as determined from the Coast and Geodetic tide gaugings being assumed as 10 meters and 30 feet, respectively), practically never occurs. Observations on the elevation of deposits in existing sewers appear to show that the deposits extend approximately to this elevation and no higher. It has therefore been determined that no outfall shall be placed lower than 10.30 meters city datum or 31 feet sewer datum. While it is quite possible that deposits may have resulted from the open passage from one system to another, the sluggish movements of water entering at the approach to high tide and the small difference in surface levels of the esteros connected, all of which would be favorable to deposit, it is believed that the rule determined upon is a rational one. Thus far all new storm drains have been built under the rule and have been found to be clear at the end of the dry season. Furthermore, there has been

no such noticeable silting at the outfalls as has been observed with the old Spanish drains, which rather indicates that the full force of the current on the ebb is available for flushing.

VARIATIONS IN ESTERO LEVELS AND ESTERO CURRENTS.

A few disconnected observations on the level of water in the esteros lead to the belief that there are variations in surface levels which seem to bear very little relation to the tidal variations. High water in esteros far from the sea occurs at no very definite period after high tide in the free bay. The time of low water, however, seems to be coincident, or nearly so, with low water in the free bay, although the elevation of this low water is greater than that of the bay. This condition is noticeable at points far from the mouths of the esteros, particularly in the districts of Santa Cruz, Quiapo, and Sampaloc.

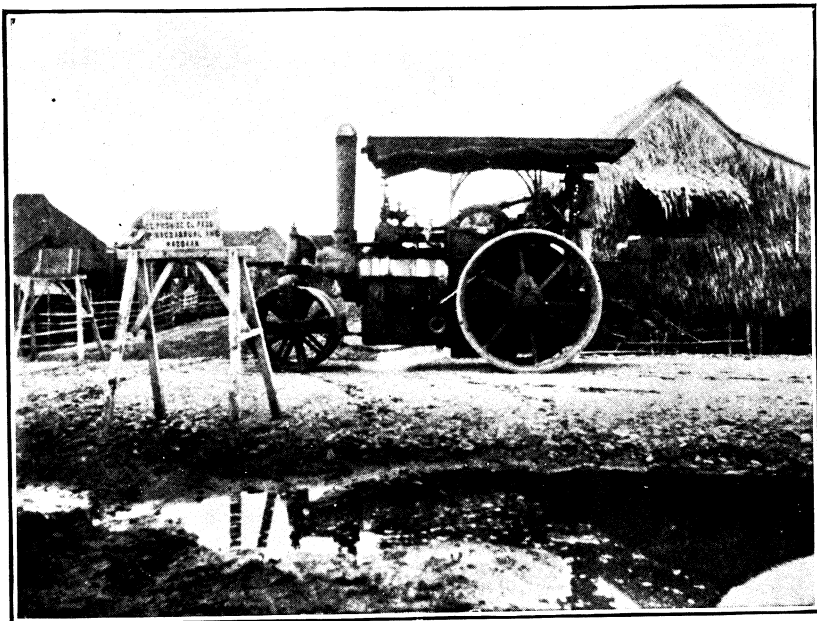
Due to these differences, certain currents are generated which, on passing examination, appear to follow no definite rule. Indeed, in some cases observations on estero flow taken at rather widely separated points at approximately the same time, there were currents in opposite directions indicating a summit somewhere between the points of observations.

These questions must be thoroughly determined so as to make drain construction most effective and to furnish a guide to the proper inclosing of the esteros. A series of observations to this end is shortly to be undertaken. Gauges to city datum will be established at various points on all the more important waterways and simultaneous readings taken. By this method it is hoped that very valuable information will be collected.

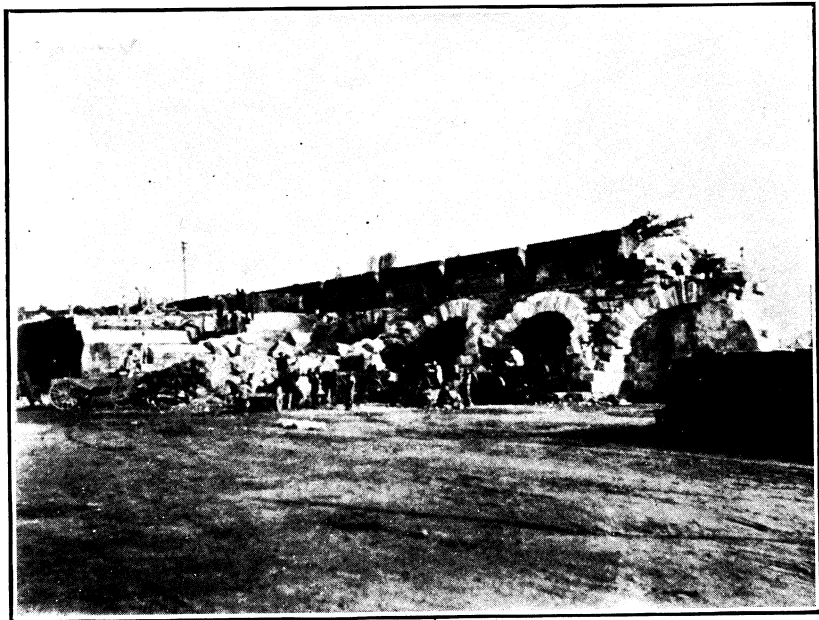
STREET GRADES AND DRAINAGE AREAS.

Equally as important as outfall elevations is the establishment of street grades. Notes taken during heavy rainfalls give evidence of the fact that streets have been so graded as to draw back the water into the gutters. In consequence of the lack of a definite plan for street drainage the drainage areas have been badly mixed. The effort to carry off drain water to the low points has resulted in the construction at large expense of deep gutters which must eventually be abandoned. Fortunately, however, there has been no new drain construction of any moment, so that no complications arise. The Spanish drains must be practically rebuilt or abandoned, and in consequence need not be considered in the design.

The flat grades of the natural surface which are found in Manila make it necessary to keep gradients as low as possible in order that economy in filling may be secured. The minimum gradients to gutters has been set as 2 in 1,000, which experience here has shown will, under ordinary rainfall and with reasonably well-kept road surface, suffice to drive the water to the inlets in a satisfactory manner. The laying of gutters even on this gradient is very difficult, and a decrease in gradient



STREET CONSTRUCTION, DISTRICT OF TONDO.



REMOVING OLD SPANISH WALL ALONG PASIG RIVER (PRISON LABOR) FOR PURPOSE OF
OPENING UP RIVER FRONT FOR DOCKS.

below the minimum set is not justifiable on account of appearance and extra inspection.

Street levels in connection with the street railway construction have been established, but the results are not satisfactory for the reason that the time did not admit of a careful consideration of the districts as a whole. Grades for the district of Santa Cruz have been finally set as indicated on the accompanying plan and those for the districts of San Nicolas and Binondo are under consideration.

INTENSITIES OF RAINFALL AND RUN-OFF.

The records of the Weather Bureau show that within the past nineteen years no more than sixteen storms of an intensity of 2 inches per hour have occurred. (See Table No. 1.)

It is clear from the accompanying table that it is unreasonable to design a drainage system providing for rains of greater intensity than 2 inches per hour. Under present conditions flooding occurs over the whole of the low-lying districts during rains of intensities greater than 3 inches per hour, and can not be prevented except by the expenditure of an enormous sum of money. It has been assumed, therefore, that it is sufficient to provide for a rainfall of 2 inches per hour, with a run-off coefficient of 75 per cent in built-up districts and 50 per cent in rural and suburban districts, and under this assumption the drains so far constructed have been designed. It might be well to remark that in the event of rains of greater intensity than 2 inches per hour the inlets will be choked and the drains flow under an additional head.

PREVENTION OF DEPOSIT.

It is well known that the tendency of the drains to clogging from the large quantities of vegetable and earthy matter brought down from the lake and sand blown in by winds from the west is pronounced, and that even under the most favorable circumstances the outfalls and the drains must be cleaned to maintain their full carrying capacity. It is possible, however, to lessen this tendency by a better adjustment of grade, assuming a minimum cover of 60 centimeters over all drains and designing the drainage areas so as to reduce to the minimum the lengths of sewers. This system will increase the original cost but will save considerable expense in maintenance, which is really the governing factor.

The Spanish drains are, as far as known, connected to two water courses at least, and hence, as before mentioned, currents are set on in them, due to differences in the water levels of the esteros, dependent upon the state of the tide. The rapid silting up of the esteros whose currents have approximately the same velocities as those in the drains surely confirms this observation, and it is therefore proposed to prevent this condition by a thorough separation of all drainage areas.

That the deposits in the drains result mostly from the tides is shown quite conclusively by the sewers in Intramuros and Binondo. In Intra-

muros the streets are practically all covered with crushed rock from the Binangonan quarry and are clear at the end of the dry season except in those faulty drains where the water is flowing against grade. With the drains along the Escolta and Calle Rosario under paved roadways kept scrupulously clean and with silt basins, deposit is very pronounced and consists mostly of sand and decayed vegetable matter. The conclusion that it is the tide which is the main factor in deposit is therefore rational.

BASIS OF COMPUTATIONS AND DESIGNS.

The drains should be designed according to Kutter's formula, which, although giving results apparently too large, has the advantage of being well established. Computations according to Burkli-Ziegler's and McMath's formulas for run-off produce results which are not borne out by the facts, the computed being in all noted cases far below the actual run-offs. No account should be taken of the increased capacity resulting from head in the inlets in the belief that this should be viewed as a safety factor and the intensity of rainfall of 2 inches per hour should be assumed as constant over the whole drainage area, since every such area is small. The roughness factor " μ " in Kutter's formula has been taken as 0.013 for good salt-glazed pipe and 0.015 for Japanese vitrified clay pipe and cement pipe. It is not deemed advisable to seek a reduction in the coefficient for cement pipe by coating the interior with pitch because of the technical difficulties of applying this coating properly and the possibility that the coating will prove a failure in actual practice.

It has been assumed that a head room or clear covering of 60 centimeters will be no more than sufficient to prevent fracture of the drain and to insure the necessary strength vitrified clay pipe or reinforced cement construction will in many cases be necessary. The cement pipe now furnished is, under present market prices, the only material economically possible. It can not be asserted that its use has given satisfaction for it is imperfectly made, is weak under sudden loads, and is liable to fracture in transportation. Unless the price of vitrified clay pipe is much reduced it can never come into general use for street drainage except in special cases. It is believed that particularly for the larger drains—because of restricted head room and poor foundations—it will be necessary to build the drain in the trench and that for economy expanded-metal construction must be employed.

It was first thought that the interval between catch basins should be 150 meters, but experience has shown this to have been a false assumption. Flat gradients make it wiser to remove the storm waters promptly, and a distance of 120 meters is now believed to be the absolute limit of separation. So far there has been no effort to construct silt basins at the inlets but this will certainly be necessary to protect against choking from street washings. Trapping of inlets is not required and would in any case be very difficult because of the shallow drains.

METHOD OF CONDUCTING THE WORK.

As before stated, the drainage in any one district is practically independent of that in the others and the work may be taken up as funds become available, without attention to the other districts. It is, however, impracticable to undertake the street drainage unless the reconstruction of the streets immediately follows, for there will of necessity be many changes in the direction of gutter flow.

Detailed drawings of all special work, standard sections, and minor details should be made, so that during the progress of the work there may be no delays. Plans and profiles must be prepared so that detailed cost sheets may be secured. The work heretofore carried on has been too hurried for the collection of data of any value concerning unit cost or subsoil conditions, and these data can be collected only by increasing the force of engineers. It is recommended, therefore, that before the drainage work is commenced in earnest the staff be so increased as to permit of the organization of several field parties and a designing force.

DRAINAGE FOR THE DISTRICT OF SANTA CRUZ.

The conditions in this district are so well defined and the esteros of such depth that it has been deemed quite safe to prepare plans for a drainage system without the need of examining further into the matter of grades, etc. The general scheme is outlined in the accompanying plan and detailed estimates of cost. (See Table No. 2.)

Street reconstruction and curb laying must immediately follow the construction of the drains, and the cost of this has been included in the estimate. The work could be finished as far as the sewer work is concerned within five or six months.

CONSTRUCTION AND REPAIR OF SEWER AND DRAINS DURING THE YEAR.

New work.—There were fifteen jobs undertaken to improve the drainage on important streets, including Calle Concepcion, Ermita, Calle General Solano, Calle San Miguel, Calle Tanduary, and Calle Padre Faura. The detailed statement is included in the accompanying table. (See Table No. 3.) All the drains were built to line and grade and may be incorporated into the finished system. During the past season these new drains acquitted themselves well and no silting was observed. All have numerous manholes which admit of ready inspection of their entire length. There has, however, been no general plan under which they were constructed in view of the restricted appropriations and the lack of materials.

Repairs and cleaning.—In all, 204 jobs were carried to completion, as indicated in the above-mentioned table. The jobs varied in cost from a few pesos for the cleaning of an inlet to an expenditure of several hundred pesos for the construction of a section of drain. To this work

has been charged the construction of 63 new manholes on old sewers, 16 catch basins with improved inlet grating, and 6 catch basins with square covers. It is necessary to continue the construction of manholes on the old Spanish drains, as there is great difficulty at the present time in making inspections, cleaning, and repairs. The inlet areas must also be increased to prevent flooding. The Spanish inlet covers fail to pass sufficient water even in ordinary showers, and these must be replaced by modern gratings. The work outlined above will be carried on in the coming year.

A new inlet grating and an improved manhole frame and cover were adopted. The designs have given great satisfaction. A design for septic tank to supersede the pozo maura was also prepared. Several tanks constructed in conformity with this plan have shown satisfactory results.

Curb grades for several districts have also been established so that it is now possible to proceed with the work of grading the streets and of constructing sidewalks.

TABLE NO. 1.—*Rainfall data for the city of Manila for the years 1887-1903.*

Date.	Hour.	Rain-fall.	Causes of rains.	Hourly intensity.	Precipitation.	Remarks.
		<i>Mm.</i>			<i>Inches.</i>	
May 21, 1892	5-6 p. m.	60	Intense local thunderstorm.	4.72	2.36	These 60 millimeters were registered by Casella pluviograph in thirty minutes.
June 15, 1891	7-8 a. m.	55	Influence of distant depression.	4.42	.59	15 millimeters registered in eight minutes.
Sept. 18, 1887	6-7 p. m.	52.5	Intense thunderstorm.	3.14	1.57	40 millimeters recorded by the pluviograph in thirty minutes.
Aug. 26, 1903	7-8 p. m.	52.2	Thunderstorm; distant depression to the east.	3.24	1.62	41.2 millimeters registered in thirty minutes.
July 19, 1899	1-2 a. m.	51.3	Extensive thunderstorm due to influence of distant typhoon.	3.14	.785	20 millimeters registered in fifteen minutes.
Sept. 15, 1891	5-6 p. m.	50.3	Distant typhoon.	3.92	.785	20 millimeters registered in twelve minutes.
July 16, 1890	5-6 p. m.	50	Distant typhoon north.	1.97	-----	
Nov. 16, 1891	3-4 p. m.	49.8	Influence of a typhoon that crossed southern Mindanao.	1.96	-----	
June 1, 1902	4-5 p. m.	48.5	Thunderstorm; distant depression to the northeast.	1.91	-----	
Aug. 6, 1889	2-3 p. m.	48	Thunderstorm.	5.04	.59	15 millimeters registered in seven minutes.
June 30, 1889	2-3 p. m.	47.2	do	3.54	1.18	30 millimeters registered in twenty minutes.
Sept. 14, 1898	1-2 a. m.	47.2	Distant depression	3.48	.985	25 millimeters registered in seventeen minutes.
Aug. 27, 1888	2-3 a. m.	47	do	1.85		
Sept. 17, 1888	7-8 p. m.	47	Thunderstorm	3.07	1.79	45.5 millimeters fell in thirty-five minutes.
Aug. 28, 1897	3-4 p. m.	46	Very intense local thunderstorm.	5.89	1.57	40 millimeters fell in a short space of sixteen minutes.
Mar. 9, 1894	0-1 p. m.	45.8	Thunderstorm.	3.14	-----	
Sept. 6, 1896	1-2 a. m.	44	do	3.14	.985	20 millimeters registered in fifteen minutes.
July 23, 1888	4-5 a. m.	42.8	do	2.36		
Aug. 26, 1886	5-6 p. m.	42	do	2.36	.59	15 millimeters registered in fifteen minutes.
May 29, 1891	7-8 p. m.	42	do	4.72	.787	20 millimeters registered in ten minutes.

TABLE NO. 2.—*Estimate of cost of Santa Cruz drainage system.*

Street.	Brick, at ₱24.20 per 1,000.		Cement, at ₱5.05 per barrel.		Sand, at ₱1.32 per cubic meter.		Inlets, No. 1, at ₱38.50 each.	
	Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.
Soler	198,800	₱4,810.96	210	₱1,060.29	100	₱132.00	16	₱616.00
Zacateros	1,800	43.56	15	75.73	10	13.20	6	231.00
Lacoste	1,600	38.72	10	50.49	10	13.20	5	192.50
Arranque	1,100	26.62	6	30.29	5	6.60	4	154.00
Obando	900	21.78	5	25.24	5	6.60	3	115.50
Dolores	2,300	55.66	12	60.58	10	13.20	6	231.00
Plaza Goiti	900	21.78	4	20.19	2	2.64	3	115.50
Carriedo	700	16.94	4	20.19	2	2.64	2	77.00
Ronquillo	1,400	33.88	6	30.29	5	6.60	4	154.00
Mabolo	37,900	917.18	66	333.23	40	52.80	17	654.50
Noria	3,200	77.44	13	65.63	10	13.20	10	385.00
Echague	1,600	38.72	10	50.49	7	9.24	5	192.50
Padre Ducos	3,000	72.60	16	80.78	10	13.20	9	346.50
Elizondo	5,400	130.68	26	131.27	20	26.40	15	577.50
Escaldo	2,700	65.34	14	70.68	10	13.20	9	346.50
Raon	17,720	428.82	30	151.47	20	26.40	9	346.50
Soler Extension	1,100	26.62	8	40.39	5	6.60	4	154.00
Estero Cegado	10,100	244.42	16	80.78	10	13.20	15	577.50
Total	292,220	7,071.72	471	2,378.01	281	370.92	142	5,467.00

Street.	Manhole covers, at ₱24.31 each.		Vitrified pipe.					
			8 inch, at ₱2.596 each.		12 inch, at ₱5.236 each.		15 inch, at ₱7.26 each.	
	Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.
Soler	10	₱243.10	80	₱207.68	60	₱314.16	120	₱871.20
Zacateros	2	48.62	30	77.88			75	544.50
Lacoste	2	48.62	30	77.88			60	435.60
Arranque	1	24.31	25	64.90			45	326.70
Obando	1	24.31	20	51.92			55	399.30
Dolores	3	72.93	35	90.86			70	508.20
Plaza Goiti	1	24.31	25	64.90			44	319.44
Carriedo	1	24.31	15	38.94	50	261.80		
Ronquillo	2	48.62	30	77.88			85	617.10
Mabolo	7	170.17	85	220.66	130	680.68		
Noria	4	97.24	50	129.80	40	209.44	35	254.10
Echague	2	48.62	30	77.88			30	217.80
Padre Ducos	4	97.24	60	155.76	130	680.68		
Elizondo	8	194.48	75	194.70	156	816.81	64	464.64
Escaldo	3	72.93	45	116.82			74	537.24
Raon	4	97.24	45	116.82			90	653.40
Soler Extension	1	24.31	20	51.92				
Estero Cegado	7	170.17	75	194.70				
Total	63	1,531.53	775	2,011.90	566	2,963.57	847	6,149.22

Street.	Vitrified pipe.						Lumber, at ₱55 per 1,000 feet.	
	18 inch, at ₱9.196 each.		20 inch, at ₱11.902 each.		24 inch, at ₱18.70 each.			
	Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.
Soler							5,000	₱275.00
Zacateros					100	₱1,870.00		
Lacoste			50	₱595.10				
Dolores	112	₱1,029.95						
Mabolo			60	714.12			1,000	55.00
Noria	60	551.76						
Echague	60	551.76						
Padre Ducos			40	476.08	62	1,159.40		
Elizondo	46	423.01			94	1,757.80		
Escaldo	36	331.05	46	547.49				
Raon					38	710.60	1,000	55.00
Soler Extension			96	1,142.59				
Estero Cegado							3,000	165.00
Total	314	2,887.53	292	3,475.38	294	5,497.80	10,000	550.00

TABLE No. 2.—*Estimate of cost of Santa Cruz drainage system—Continued.*

Street.	Total material.	Labor.	Transportation.	Inspection.	Grand total.
Soler	P8,530.39	P3,250.80	P200.00	P200.00	P12,181.19
Zacateros	2,904.49	475.55	75.00	50.00	3,505.04
Lacoste	1,452.11	297.10	40.00	40.00	1,829.21
Arranque	633.82	129.35	30.00	30.00	822.17
Obando	644.65	138.65	30.00	30.00	843.30
Dolores	2,062.38	469.40	60.00	50.00	2,641.78
Plaza Goiti	568.76	127.90	25.00	25.00	746.66
Carriedo	441.82	102.70	20.00	20.00	584.52
Ronquillo	968.37	223.15	30.00	30.00	1,251.52
Mabolo	3,798.34	1,208.40	100.00	75.00	5,181.74
Noria	1,783.61	363.95	60.00	50.00	2,257.56
Echague	1,187.01	252.60	40.00	40.00	1,519.61
Padre Ducos	3,082.24	558.50	100.00	75.00	3,815.74
Elizondo	4,717.29	867.90	150.00	125.00	5,860.19
Escaldo	2,101.25	438.10	80.00	75.00	2,694.35
Raon	2,586.25	695.82	100.00	100.00	3,482.07
Soler Extension	1,446.43	284.20	60.00	50.00	1,840.63
Estero Cegado	1,445.77	826.10	50.00	50.00	2,371.87
Total	40,353.98	10,710.17	1,250.00	1,115.00	53,429.15

Total estimate	P53,429.15
Construction, emergencies, and 10 per cent contingent expenses	5,342.92
Total for drain construction	58,772.07
22,000 linear meters curbing, at P1.78	39,160.00
18,750 cubic meters of fill and surface dressing, at P2	37,500.00
Grand total	135,432.07

TABLE No. 3.—*Cost of sewer construction, cleaning, and repairs for fiscal year 1904.*

Location of sewers.	Month.	Job No.	Total length in meters.	Size of sewers.		Bricks.	Cement.	Sand.
				Inches.	Centi-meters.			
<i>Construction.</i>								
Concepcion, Ermita	October	1	180.5		60	14.62	15.51	1.41
Hospital	do	2	125.3	8, 12		58.08	46.53	8.45
Suspension, Ermita	October and November.	3	128.1	8, 12		105.60	82.72	8.45
General Solano, San Miguel.	December	14	90.5		30	15.84	82.72	22.53
Concepcion, Ermita	January	25	20		60	.31	43.95	5.63
Trinidad, Santa Cruz	February	6	108	6		11.11	46.53	3.52
General Solano, San Miguel.	do	37	33		30	2.64	5.17	1.41
Callejon, San Miguel	January, February, and March.	48	103		30	19.27	92.14	23.76
Santa Monica, Tondo	March	9	114		30	7.92	58.07	
Padre Herrera, Tondo	April	10	124	12		13.46	83.02	13.20
Tanduay, Tandua	do	11	256		30	36.83	40.39	13.20
Padre Faura, Dilao	May	12	283	12, 24		22.86	58.07	13.20
Romero Aquino	June	13	126	8, 12		13.20	30.29	2.64
Paco fire station	do	14	15		15		2.53	
San Miguel, San Miguel	do	15	96	12, 24		7.92	25.25	13.20
Total ⁷			1,802.4			319.66	712.90	130.60
<i>Cleaning and repairs.</i>								
Various	October	7				13.20	12.93	2.82
Do	November	14				136.49	110.45	11.26
Do	December	6				29.15	43.95	5.63
Do	January	29				74.37	78.77	15.58
Do	February	7				32.29	52.85	9.86
Do	March and April.	18				5.02	17.26	
Do	May	12				11.69	8.59	6.60
Do	June	80				48.40	73.22	3.96
Total ⁷						350.61	398.02	55.71
Grand total ⁸		204				670.27	1,110.92	186.31

¹ Trench filled for lack of funds.² Extension Job No. 1.³ Extension Job No. 4.⁴ Difficult work in narrow alley.⁵ House connection.⁶ Unfinished.⁷ Including 10 per cent Insular Purchasing Agent's charges.⁸ Transportation item incomplete.

TABLE No. 3.—Cost of sewer construction, etc.—Continued.

Location of sewers.	Month.	Job No.	Manhole covers.	Inlets, No. 1.	Grating square.	Vitrified clay pipe.		
						6 inch.	9 inch.	12 inch.
<i>Construction.</i>								
Concepcion, Ermita	October	1	P28.60		P8.34			
Hospital	do	2	114.40		33.35			
Suspension, Ermita	October	3	60.06	P154.00	58.37	P206.25	P209.44	P582.12
	and November.						340.56	871.99
General Solano, San Miguel.	December	4	30.00	77.00				
Trinidad, Santa Cruz.	February	6	120.12			431.75		
Callejon, San Miguel.	January,	8	33.00	77.00			37.51	
	February, and March.							
Santa Monica, Tondo.	March	9			21.48			
Padre Herrera, Tondo.	April	10	35.08	77.00	21.48	16.50	61.38	935.15
Tanduay, Tanduary	do	11	72.93	154.00			101.38	
Padre Faura, Dilao.	May	12	97.24	231.00			202.75	294.11
Romero Aquino	June	13		154.00	10.74		272.45	278.90
San Miguel, San Miguel.	do	15		115.50				
Total			591.43	1,039.50	153.76	654.50	1,225.47	3,002.27
<i>Cleaning and repairs.</i>								
Various	October	7			8.34			
Do	November	14	330.33	192.50	8.34			
Do	December	6	30.03	38.50				
Do	January	29	690.69					
Do	February	7	273.00					
Do	March and April.	18					126.17	
Do	May	12	48.62		14.64			
Do	June	80	145.86	385.00			47.52	
Total			1,518.53	616.00	31.32		173.69	
Grand total		204	2,109.96	1,655.50	185.08	654.50	1,399.16	3,002.27

Location of sewers.	Month.	Job No.	Vitrified clay pipe.		Cement pipe.			
			15 inch.	18 inch.	15 centi-meter.	20 centi-meter.	25 centi-meter.	30 centi-meter.
<i>Construction.</i>								
Concepcion, Ermita	October	1					P49.50	
Hospital	do	2			P123.40	P101.64	250.80	
General Solano, San Miguel.	December	4			13.53			P248.87
Do	February	7						90.75
Callejon, San Miguel.	January,	8						396.55
	February, and March.							
Santa Monica, Tondo.	March	9						407.55
Tanduay, Tanduary	April	11						915.20
Padre Faura, Dilao.	May	12	P1,211.13	P977.22				
Romero Aquino	June	13				53.24		26.81
Paco fire station	do	14			26.40			
San Miguel, San Miguel.	do	15	329.56					35.75
Total			1,540.69	977.22	163.33	154.88	300.30	2,121.48
<i>Cleaning and repairs.</i>								
Various	November	14			125.14	145.40		
Do	December	6			7.26			
Do	March and April.	18			10.73			
Total					143.13	145.40		
Grand total		204	1,540.69	977.22	306.46	300.28	300.30	2,121.48

TABLE No. 3.—*Cost of sewer construction, etc.*—Continued.

Location of sewers.	Month.	Job No.	Cement pipe, 60 centimeter.	Lumber.	Miscellaneous.	Total cost of materials.	Labor.
<i>Construction</i>							
Concepcion, Ermita	October	1	P1,985.50	P27.50		P2,120.98	P318.06
Hospital	do	2			P2.20	1,530.41	636.11
Suspension, Ermita	October and November.	3			.88	1,888.88	321.06
General Solano, San Miguel.	December	4				490.49	273.00
Concepcion, Ermita	January	5	220.00	94.25	20.77	384.91	124.50
Trinidad, Santa Cruz	February	6				613.03	319.49
General Solano, San Miguel.	do	7				99.97	125.25
Callejon, San Miguel	January, February, and March.	8			.77	680.00	1,539.93
Santa Monica, Tondo	March	9				495.02	239.75
Padre Herrera, Tondo	April	10				1,296.28	188.75
Tanduay, Tandauy	do	11			2.50	1,336.43	378.00
Padre Faura, Dilao	May	12	821.70		1.73	3,931.01	819.75
Romero Aquino	June	13				842.27	262.58
Paco fire station	do	14				28.93	24.50
San Miguel, San Miguel	do	15	574.20		3.37	1,104.75	336.95
Total			3,601.40	121.75	32.22	716,843.36	5,907.68
<i>Cleaning and repairs.</i>							
Various	October	7				37.29	196.80
Do	November	14				1,059.91	924.00
Do	December	6			.44	154.96	387.25
Do	January	29				859.41	130.25
Do	February	7				368.00	55.12
Do	March and April.	18				159.18	892.26
Do	May	12			5.50	95.64	148.91
Do	June	80				703.96	358.96
Total					5.94	3,438.35	2,993.55
Grand total		204	3,601.40	121.75	38.16	20,281.71	8,501.23

Location of sewers.	Month.	Job No.	Transportation.	Inspection.	Total cost.	Total cost per meter.	Per cent of labor to materials.	Per cent material to total cost.
<i>Construction.</i>								
Concepcion, Ermita	October	1		P99.30	P2,538.34	P14.06	15	83.6
Hospital	do	2		125.73	2,292.25	18.29	41.6	66.8
Suspension, Ermita	October and November.	3		67.12	2,277.06	17.78	17	83.0
General Solano, San Miguel.	December	4		72.00	835.49	9.23	55.7	58.7
Concepcion, Ermita	January	5		33.00	542.41	27.12	32.4	71.0
Trinidad, Santa Cruz	February	6		90.00	1,022.52	9.47	52.1	60.0
General Solano, San Miguel.	do	7		24.00	249.22	7.55	125	40.1
Callejon, San Miguel	January, February, and March.	8		45.00	2,264.93	21.99	226.5	30.0
Santa Monica, Tondo	March	9		52.50	787.27	6.91	48.5	62.9
Padre Herrera, Tondo	April	10		82.50	1,567.53	12.64	14.6	82.7
Tanduay, Tandauy	do	11		41.25	1,755.68	6.86	28.3	76.1
Padre Faura, Dilao	May	12	P77.40	105.00	4,933.16	17.43	20.8	97.7
Romero Aquino	June	13	43.00	7.50	1,155.35	9.17	31.2	73.0
Paco fire station	do	14	4.30		57.73	3.85	81.8	50.0
San Miguel, San Miguel.	do	15	34.40	7.50	1,483.60		30.5	74.5
Total			159.10	852.40	23,762.54		35.1	70.9

TABLE No. 3.—*Cost of sewer construction, etc.*—Continued.

Location of sewers.	Month.	Job. No.	Transportation.	Inspection.	Total cost.	Total cost per meter.	Per cent of labor to materials.	Per cent material to total cost.
<i>Cleaning and repairs.</i>								
Various.....	October.....	7		P38.45	P272.54			
Do.....	November.....	14		93.00	2,076.91			
Do.....	December.....	6		72.00	614.21			
Do.....	January.....	29		64.93	1,054.59			
Do.....	February.....	7		48.75	471.87			
Do.....	March and April.....	18		111.00	622.44			
Do.....	May.....	12	P2.15	83.81	330.51			
Do.....	June.....	80	32.45	122.69	1,218.06			
Total.....			34.60	634.63	6,701.13		75.4	51.3
Grand total.....		204	193.70	1,487.03	30,463.67		41.9	66.6

WATER SUPPLY.

PUMPING STATION.

The pumps, while giving good service during the past year, are surely deteriorating, and only with constant attention and repair are they able to perform the required duty. There was no shortage of water during the year because of the shortness of the heated term and the moderate temperature. There is, however, constant danger that the pumps will fail to supply the city at any time. The storage at the basins, which in the hot season is sufficient for two days' consumption only, can scarcely be considered as a relief to the pumps, and in case of breakdown there is cause for immediate alarm. The dam constructed in the past year has given fair satisfaction: Several leaks were found, but these in no way threatened the safety of the dam. The imperfect filling behind the dam arising from the haste in construction manifested itself by several cave-ins, but the body of the dam was not affected. The piling appears to be well driven, and no damage to the riprap along the downstream face has occurred from the heavy floods in October and June.

Many minor improvements to the grounds have been completed. A new house for the engineers has been built at the west entrance and the old coal shed thoroughly repaired. Storage for at least six months' supply of fuel is now available.

EL DEPOSITO.

There have been few repairs executed at this place. The buildings have been painted and general repairs to the floors and ceilings only have been ordered.

The reservation is worthy of a general improvement to fit it as a park for the public. The hill upon which the reservoir is constructed commands a fine view of the surrounding country and affords all the necessary

features of elevation, rolling lands, and drainage to fit it for a public pleasure ground. The area of the reservation according to a late survey is 132,600 square meters, of which about 40,000 square meters lie within the walls surrounding the basins, leaving a net area of approximately 92,600 square meters available for park purposes. Some clearing and filling would be required to develop the features of the landscape, and a coating of loam must be spread to afford the necessary support to shrubbery and grass. Beyond that and the construction of a few footpaths there is nothing to do. A plan of the proposed improvements is under preparation.

SANTOLAN ROAD.

This road has as in previous years given great trouble in repairs. The haulage of coal for the station and the transportation of quartermaster stores to the troops in the upper Mariquina Valley have caused the almost complete destruction of the surface laid at great cost in the latter part of 1903. This has in part arisen from the narrowness of the roadbed and from insufficient culvert area. It was expected that the road locomotive ordered from the United States would be at hand by April to make permanent repairs, and in anticipation of its arrival the repairs were stopped. It is necessary to commence work again promptly, for the rains in June have badly washed the road surfacing.

The following changes are suggested: (1) A widening of the clear roadway to 7 meters; (2) a lowering of grades to remove the dangerous descent at the siphon and that at the west approach to the station; (3) the complete covering of the wearing surface with gravel from the Mariquina River, which may be accomplished at small cost by means of the road locomotive, and (4) the planting of the road with quick-growing shade trees. These improvements might well be carried on in conjunction with the suggested conversion of the reservation at El Deposito. It is believed that this road could be made the most delightful drive around Manila at slight expense, and it is strongly recommended that steps be taken to effect the improvement.

CITY DISTRIBUTION.

Repairs.—There has been a large amount of repair work during the past year, but with the gradual removal of the old ground fire hydrants and the substitution of the new form of public hydrants with automatic faucet for the old form a gradual reduction in the item of repairs has been accomplished.

Constructions.—The house for subforemen was completed early in the year, as well as combined kitchen, laundry, bath, and toilet for those inhabiting the workmen's houses. The yards were remodeled and raised about 60 centimeters to prevent flooding. The stock was rearranged and placed in good shape.

EXTENSION OF NEW DISTRIBUTION SYSTEM.

The work accomplished comprised 45 installations of pipe, varying from 3 to 12 inches in diameter. These lines were carefully laid with reference to established street lines and graded so as to permit for discharging into favorable water courses or sewers. During the extension the fire-hydrant system was developed. The table of cost gives in detail the expense of intalling the lines.

FIRE-HYDRANT SYSTEM.

Including those installed during the construction of new distribution mains, the following hydrants were set during the year and in operation: Type A—set during year, 151; in operation, 150; Type B—set during year, 24; in operation, 32; Type C—set during year, 30; in operation, 30.

Some 100 hydrants remain to be installed, but these will be no more than sufficient for completion of work on the mains to be installed in the coming year. It is estimated that there must be in place at least 750 hydrants before the ground fire hydrants may with safety be removed. There is a great deal of difficulty in keeping these latter in serviceable condition, and as the covers are often covered with road material the operations of the Fire Department are considerably hampered. The engine companies must now carry two couplings—one with American thread for the new hydrants and the other with English thread for the ground hydrant. The advisability of altering these hydrants to accommodate the American standard thread has been considered, but other work prevented a careful examination.

INSTALLATION AND REPAIR CARDS.

There are on file the following cards with profiles of the mains constructed:

Pipe installation	57
Fire-hydrant installation	78
Pipe repair	755
Pipe location	934
Relocation of ground hydrant	241
Miscellaneous	18

These cards are returned by the foreman of distribution with a sketch and actual cost of work performed. So far a few have been plotted because of the small force available, but the value of the data collected is in no wise impaired by the postponement of the work.

DETERMINATION OF THE TIME AND RATE OF MAXIMUM—HOURLY CONSUMPTION.

The occurrence and amount of the maximum hourly consumption is a matter of much importance in the design of a sewerage system into which

it enters as a governing factor. It had been previously known that the supply was restricted during the hours immediately following sunrise and again at noon and at sunset, but the approximate amount of this consumption had never been clearly determined.

A series of hourly observations upon the variation of water level in the reservoir was instituted in September and continued during the subsequent months to December 31, 1903. These observations were then combined with the pumpage statistics and the total consumption for each hour computed. The hourly volumes were then reduced to percentages of daily consumption, the results plotted, and a curve drawn through the mean points.

The study of the curve reveals the following interesting facts:

(a) There are four well-defined maxima at 7 a. m., 12 m., 3 p. m., and 6 p. m., and four minima at 3 a. m., 11 a. m., 2 p. m., and 4 p. m. The small irregularities in the curve between these points are probably due to the method of plotting.

(b) The effect of street sprinkling is immediately noticeable.

(c) The monthly curves (not plotted in the diagram) are to all intents parallel, indicating that the maxima and minima recur regularly.

(d) The maximum hourly consumption is about five forty-fifths per cent of the total daily and about 1.3 times the average hourly consumption. While extreme accuracy can not be claimed for the results, it is clear from the recurrence of the maximum and minimum points that confidence may be reposed in the conclusions. The error is probably not greater than 5 per cent at any point, which is quite sufficient for practical considerations.

TABLE NO. 4.—*Operation, in hours, of engines.*

Month.	Engine No. 1.		Engine No. 2.		Engine No. 3.		Engine No. 4.	
	Month.	Day.	Month.	Day.	Month.	Day.	Month.	Day.
1903.								
July	639	20.6	579	18.7	604	19.5	659	21.3
August ¹	744	24			744	24	744	24
September ¹	598	19.9	198	6.6	645	21.5	714	23.8
October	104	3.3	744	24	640	20.6	744	24
November	548	17.7	708	22.8	343	11.1	599	19.3
December ¹	707	22.8	271	8.7	694	22.4	590	19
1904.								
January	742	23.9	690	22.3	98	3.2	742	23.9
February	353	12.2	619	21.3	565	19.5	604	20.8
March	682	22	666	21.5	482	15.6	708	22.8
April	662	22.1	700	23.3	596	19.9	698	22.3
May	701	22.6	694	22.4	604	19.5	678	21.9
June ²	662	22.1	656	21.9	599	20	563	18.8
Average	595	19.4	544	17.8	551	18.1	670	21.9
Total	7,142		6,525		6,614		8,043	

¹No. 2 under repairs.

²No. 4 under repairs.

Average of the four engines, 19.3 hours per day; total of the four engines, 28,324 hours.

TABLE NO. 5.—*Coal consumption.*

Month.	Coal consumed. ¹		Ashes yielded.		Water pumped. ²	
	Per month.	Per day.	Quantity. ¹	Percentage.	Per month.	Per day.
1903.						
July	203.39	6.561	-----	-----	1,111,291	39,074
August	204.80	6.606	-----	-----	924,376	29,818
September	195.35	6.512	-----	-----	884,797	29,493
October	199.00	6.419	24.65	12.4	916,664	29,570
November	192.90	6.430	25.52	13.2	909,020	30,301
December	220.55	7.115	26.28	11.9	927,986	29,935
1904.						
January	215.95	6.696	22.25	10.3	945,268	30,492
February	202.24	6.974	10.49	9.6	880,427	30,359
March	223.45	7.208	23.01	10.3	1,047,716	33,797
April	234.01	7.800	24.07	10.3	1,094,440	36,481
May	241.11	7.455	25.09	10.4	1,103,001	35,580
June	222.55	7.418	22.48	10.1	1,020,982	34,033
Average	212.94	6.933	22.65	10.9	980,497	32,411
Total	2,565.30	-----	203.84	98.5	11,765,968	-----

¹ Tons of 2,240 pounds.² Estimated in cubic meters.TABLE NO. 6.—*Water consumption.*

Month.	Water pumped. ¹		Water consumed. ²				Total rainfall. ³		Average temperature. ⁴	
	Per month.	Per day.	Per month.	Per day.	Per capita per day. ⁵	U. S. gallons.	Per month.	Departure from normal.	Per month.	Departure from normal.
1903.	<i>Cubic meters.</i>	<i>Cubic meters.</i>	<i>Cubic meters.</i>	<i>Cubic meters.</i>	<i>Liters.</i>	<i>gallons.</i>	<i>Mm.</i>	<i>Mm.</i>	<i>°C.</i>	<i>°C.</i>
July	1,111,291	39,074	1,035,391	33,400	150	39.6	267.2	-110.9	27.9	+0.7
August	924,376	29,818	908,376	29,302	131.4	34.7	180.9	-175.7	28	+ .8
September	884,797	29,493	869,195	28,973	130	34.3	149.7	-219.2	27.4	+ .3
October	916,664	29,570	928,663	29,957	134.3	35.5	75.7	-113.1	27.5	+ .5
November	909,020	30,301	917,211	30,577	137.1	36.2	45.8	-88.3	26.5	+ .3
December	927,986	29,935	891,658	28,763	129	34.1	148.5	+ 88.1	25.3	+ .0
1904.										
January	945,268	30,492	941,730	30,378	136.2	36	34.8	+ 5.8	25.1	.0
February	880,427	30,359	884,328	30,494	136.7	36.1	27.1	+ 16.9	25.4	-.1
March	1,047,716	33,797	1,043,620	33,665	150.9	39.9	11.2	- 6.7	26.2	-.7
April	1,094,440	36,481	1,094,163	36,472	163.5	43.2	30.8	+ 2.7	26.9	-1.4
May	1,103,001	35,580	1,093,426	35,272	158.1	41.8	70.4	- 29	27.8	-1.0
June	1,020,982	34,033	1,017,540	33,918	152	40.1	437.1	+193.3	27.2	-.9
Average	980,497	32,411	968,775	31,772	141.7	40	123.3	- 36.3	26.8	-.125
Total	11,765,968	-----	11,625,301	-----	-----	-----	1,479.2	-436.1	-----	-----

¹ Estimated at engine.² Estimated at reservoir.³ At Manila Observatory.⁴ In shade; hourly readings.⁵ Population, 223,000.TABLE NO. 7.—*Metered consumption.*

[Quantity is expressed in cubic meters.]

Month.	Intramuros.	Binondo.	Santa Cruz.	Tondo.	Quiapo.	San Miguel.	Sampaloc.
1903.							
July	26,934	44,932	44,748	22,589	30,380	25,043	18,332
August	25,654	41,793	35,965	23,145	24,330	13,900	16,040
September	23,289	40,011	32,642	22,622	23,548	17,218	15,095
October	25,519	43,373	54,910	26,038	24,958	18,903	17,480
November	28,058	38,548	33,380	21,850	22,345	19,890	18,024
December	29,910	36,720	30,921	30,011	43,135	13,680	14,142

TABLE No. 7.—*Metered consumption*—Continued.

[Quantity is expressed in cubic meters.]

Month.	Intra-muros.	Binondo.	Santa Cruz.	Tondo.	Quiapo.	San Miguel.	Sampaloc.
1904.							
January	33,013	39,692	41,145	34,239	24,744	18,620	16,688
February	27,330	34,947	33,646	26,942	23,342	16,520	14,468
March	29,125	37,552	33,861	32,569	27,537	19,049	16,524
April	35,530	48,380	41,902	34,966	31,903	23,515	20,824
May	36,813	47,602	41,522	33,464	22,991	21,404	23,702
June	33,504	36,755	37,074	36,105	20,884	19,325	22,285
Total	354,679	490,305	461,716	344,540	320,097	227,067	214,104
Total previous	271,263	436,981	394,979	274,362	274,666	217,396	154,625
Increase over fiscal year	83,416	53,324	66,737	70,288	45,431	9,671	59,479

Month.	Dilao.	Ermita.	Malate.	San Nicolas.	Water boats.	Total.
1903.						
July	14,798	27,292	21,424	32,993	13,649	323,614
August	10,501	22,975	19,992	33,113	14,130	281,538
September	10,312	24,158	20,499	21,301	14,345	265,040
October	14,119	33,717	23,473	30,562	15,366	328,418
November	12,540	31,569	21,733	26,024	13,639	287,600
December	12,466	30,458	22,055	26,248	12,715	302,461
1904.						
January	14,131	31,179	21,398	28,125	14,086	317,060
February	12,811	28,694	17,508	25,731	12,282	274,221
March	13,534	30,355	15,406	27,201	15,553	298,266
April	16,678	39,402	2,077	33,631	21,642	369,350
May	15,729	35,089	15,086	30,713	17,068	341,183
June	13,284	30,230	17,475	27,372	12,174	306,467
Total	160,903	365,118	237,026	343,014	176,649	3,695,218
Total previous	119,429	222,637	124,708	313,719	156,615	2,961,380
Increase over fiscal year	41,474	142,481	112,318	29,295	20,034	733,838

TABLE No. 8.—*Collections.*

Month.	Water service.		Plumbing.		Fire plugs.		Fines.		Total.	
	Philippine currency.	Local currency.	Philippine currency.	Local currency.	Philippine currency.	Local currency.	Philippine currency.	Local currency.	Philippine currency.	Local currency.
1903.										
July	30,822.94	7,235.94	1,366.58	487.70	324.30	61.04			32,531.82	7,784.68
August	5,409.76	204.51	38.00	2.85			78.00	105.80	5,525.76	313.16
September	238.02		3.50				52.00		293.52	
October	35,187.32	2,046.82	1,666.74	177.02	343.03	43.01		2.30	37,197.09	2,269.15
November	4,849.89	79.03	166.74		189.00		149.64	25.70	5,355.27	104.73
December	573.99	13.57	8.00				2.00		583.99	13.57
1904.										
January	33,607.67	1,010.14	1,763.01	74.48	321.73	16.62	50.00		35,742.41	1,101.24
February	1,164.84	61.58	35.45	5.78	33.00	3.30	132.00	19.80	1,365.29	90.46
March	5,979.00	2.64	230.44		182.00		8.00	2.20	6,399.44	4.84
April	34,261.05	344.38	1,787.32	27.68	321.60	3.39	2.00		36,371.97	375.45
May	1,462.11	18.81	62.43				154.00	2.26	1,678.54	21.07
June										
Total	153,556.59	11,017.42	7,128.21	775.51	1,714.66	127.36	627.64	158.06	163,027.10	12,078.35

NOTE.—On June 1, 1904, the collections were transferred to the City Assessor and Collector, according to Act No. 1141 of May, 1904, with a credit of \$286.19, local currency, and \$65.44, United States currency, marked "bad debts," and ₱7,208.14, Philippine currency, regular credits.

TABLE NO. 9.—*Water service in operation.*

Month.	Intramuros.	Binondo.	Santa Cruz.	Tondo.	Quiapo.	San Miguel.	Sampaloc.	Dilao.	Ermita.	Malate.	San Nicolas.	Water boats.	Total.
1903.													
July.....	263	416	431	244	280	117	206	126	238	82	360	18	2,781
August.....	266	422	438	247	280	117	211	127	245	87	362	20	2,822
September.....	267	427	441	253	283	117	216	131	250	87	365	22	2,859
October.....	266	432	443	258	286	121	221	124	258	87	369	22	2,897
November.....	271	436	447	261	290	122	226	135	265	90	370	22	2,935
December.....	276	438	452	266	292	125	229	143	267	90	375	22	2,975
1904.													
January.....	280	442	459	270	296	124	230	145	271	93	378	22	3,010
February.....	279	447	464	273	298	124	236	155	276	98	379	22	3,049
March.....	281	449	469	273	299	125	243	156	277	101	386	22	3,081
April.....	283	456	475	276	302	125	246	157	282	103	396	22	3,123
May.....	287	456	481	280	304	125	252	162	287	109	403	23	3,168
June.....	288	462	486	287	306	125	254	163	290	124	409	23	3,216
New installation.....	35	54	59	57	33	14	58	40	61	45	63	6	526
Discontinuation.....	9	3	4	7	4	2	1	3	3	3	7	1	47

TABLE NO. 10.—*Meters in operation.*

Meter.	Diameter.																	
	½ inch.			¾ inch.			1 inch.			1¼ inch.			1½ inch.			2 inch.		
	In operation July 1, 1903.	Installed during year.	Total in operation.	In operation July 1, 1903.	Installed during year.	Total in operation.	In operation July 1, 1903.	Installed during year.	Total in operation.	In operation July 1, 1903.	Installed during year.	Total in operation.	In operation July 1, 1903.	Installed during year.	Total in operation.	In operation July 1, 1903.	Installed during year.	Total in operation.
Siemens-Halske.....	106	22	128	569	307	876	144	88	232	13	3	16	28	13	41	18	22	40
Taylor.....	20	3	23	403	3	406	241	3	244	44	1	45	27	7	34	44	—	44
Niagara.....	15	7	22	167	28	195	74	7	81	—	—	—	6	1	7	12	—	12
Ketterer.....	19	—	19	111	3	114	34	1	35	19	—	19	7	—	7	—	—	—
Crown.....	8	—	8	44	—	44	39	5	44	—	—	—	5	1	6	3	2	5
Meinecke.....	—	—	—	14	2	16	18	—	18	1	—	1	1	—	1	—	—	—
Meinecke Patent.....	1	—	1	62	4	66	27	—	27	2	—	2	—	—	2	—	—	—
Siemens Patent.....	18	2	20	26	—	26	8	—	8	—	—	—	—	—	—	—	—	—
Breslau.....	1	—	1	13	3	16	21	—	21	3	—	3	2	—	2	2	—	2
Lambert.....	—	—	—	29	2	31	2	—	2	—	—	—	—	—	—	—	—	—
Nash.....	1	—	1	6	3	9	13	3	16	1	—	1	1	—	1	1	1	2
Kennedy.....	—	—	—	1	—	1	3	—	3	—	—	—	—	—	5	—	—	5
Pittsburg.....	—	—	—	7	—	7	1	—	1	—	—	—	1	—	1	1	—	1
Hersey.....	2	—	2	1	—	1	1	—	1	—	—	—	—	—	—	—	—	—
Drop.....	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—
Thomson.....	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Empire.....	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Frazer.....	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—
Bee.....	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Worthington.....	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	2	—	2
Total.....	192	34	226	1,456	355	1,811	628	107	735	83	4	87	80	15	95	86	27	113

TABLE No. 10.—*Meters in operation*—Continued.

Meter.	Diameter.						Total.				Percentage repaired during year.	Ordered removed.	Percentage of ordered removed.	
	2½ inch.		3 inch.		4 inch.		In operation July 1, 1903.	Installation during year.	Total in operation.	Repaired.				
	Installed during year.	Total in operation.	In operation July 1, 1903.	Installation during year.	Total in operation.	Installation during year.								Total in operation.
Siemens-Halske			1	3	4	2	2	879	460	1,339	91	6.7	11	35.4
Tylor	1	1						779	11	790	160	20.2	10	6.4
Niagara								274	43	317	112	35.9	4	3.5
Ketterer								190	4	194	64	32.9	5	8.4
Crown								99	8	107	7	5.9		
Meinecke								34	2	36	31	86.1	11	35.4
Meinecke Patent								94	4	98	9	9.1		
Siemens Patent								52	2	54	11	20.3		
Breslau								42	3	45	7	15.5		
Lambert								31	2	33	4	12.1		
Nash								23	7	30	4	13.3	1	25
Kennedy			1		1			10		10	15	49.9	2	40
Pittsburg								10		10	3	3		
Hersey								4		4	1	25		
Drop								1		1				
Thomson								1		1				
Empire								1		1				
Frager								1		1				
Bee								1		1				
Worthington								1	2	3	1	33.3		
Total	1	1	2	3	5	2	2	2,527	548	3,075	510	16.5	33	1.07

¹ Includes repairs to captain of port meters.TABLE No. 11.—*Private fire services in operation.*

Month.	Intramuros.	Binondo.	Santa Cruz.	Tondo.	Quiapo.	San Miguel.	Sampaloc.	Dilao.	Ermita.	Malate.	San Nicolas.	Total.
1903.												
July	98	36	14	21	8	9	2	18	56	4	15	281
August	98	34	14	20	8	9	2	18	56	4	15	278
September	98	34	14	20	8	9	2	18	54	4	15	276
October	98	34	14	20	8	9	2	18	49	4	15	271
November	77	34	14	11	8	9	2	18	40	4	14	231
December	77	34	15	10	8	9	2	18	40	4	13	230
1904.												
January	76	34	15	9	8	9	2	18	40	4	12	227
February	75	34	15	9	8	9	2	18	40	2	12	224
March	75	34	15	9	8	9	2	18	40	2	12	224
April	75	34	15	9	8	9	2	18	40	2	12	224
May	75	33	15	10	8	9	2	18	34	2	12	218
June	75	33	15	9	8	9	2	18	34	2	12	217
New installation		1	1	1		1		8				12
Discontinuation	23	3		13					25	3	3	70

TABLE NO. 12.—Work on distribution system, fiscal year 1903-4.

Month.	Leaks in mains.	Valves repaired.	Air-valve leaks.	Valves set.	Valve boxes built.		Fire hydrant, old style.					
					Square.	Round.	Repaired.	Removed.	Reset.	Lids raised.	Lids replaced.	Temporary covers placed.
1903.												
July	2		1		23		27	1	27	23	23	5
August	4	2	1	1	27	1	24	3	48	24	24	7
September	4	2			23	19	30	3	13	32	32	5
October	3	2			29	11	19		2	32	32	2
November	5	2	2		30		27	6	74	30	30	6
December	1	1	2	1	16		22	5	14	16	16	1
1904.												
January	5	3	2	9	20	9	33	2	4	20	20	2
February	5	2		11	38	11	30	2	5	18	18	3
March	2	2	2	35	4	30	39		5			4
April	5	2		26	2	26	28	1				1
May	4	1		8	4	10	15		8	4	4	5
June	17	6		20	2	18	18	3	10	2	2	14
Total	57	25	10	111	188	135	322	26	210	231	231	45

Month.	Fire hydrant, new style.						Public hydrants.				Waterservices.				Meters.		
	Fire.			Sprinkling.			Old style.			Auto-matic.							
	Set.	Reset.	Repaired.	Set.	Reset.	Repaired.	General repairs.	Leaks.	Removed.	Set.	Leaks.	New, public.	New, private.	Disconnected.	Repaired.	New, set.	Repaired.
1903.																	
July			3	1			46	7	1	1		1	65	9		66	49
August	1		1				44	6	1			2	48	3	4	48	27
September				17			31	3	5				43	1	4	43	49
October	42		1				35	7	19	1			44	5	1	44	34
November			1			2	32	4	17			1	44	1	10	44	39
December			1				32	7	10			2	42	2	7	42	50
1904.																	
January	3						35	10	4			3	38	2	12	38	34
February	9						35	5	2	1			47	1	1	47	45
March	21		2		1		19			2			39	2	8	39	44
April	28				2		13		2	6		4	47	1	1	47	24
May	4						10			4	3	1	43	4	5	44	53
June	13	1				3	6	8		4	3		46	3	41	46	62
Total	121	1	9	18	3	5	338	57	61	19	6	14	547	34	70	548	510

TABLE No. 13.—Cost of installing

Pipe installation No.	Date.	Location.	District.
1903.			
12	Aug. 11-Aug. 17	Calle Herran: H Street to K Street	Malate
13	Oct. 7-Oct. 9	Calle Arquiza, dead end to Calle Padre Faura	Ermita
14	Oct. 23-Oct. 27	Calle Lardizabal, extension along east end of street	Sampaloc
15	Dec. 1-Dec. 4	Arrocero shops, fire connection	Ermita
16	Dec. 3-Dec. 5	Calle Cabanas, Real to the bay	Malate
1904.			
17	Jan. 18-Jan. 26	City Hall service connection	Ermita
18	Jan. 20-Jan. 26	H Street, Herran to Third Avenue	Malate
19	Jan. 27-Feb. 3	Calle Herran, K Street to Nozaleda	do
20	Feb. 4-Feb. 7	Calle San Marcelino, Nozaleda to Herran	Dilao
21	Feb. 18-Feb. 29	Calle Singalong, Herran to Corazon de Jesus	do
22	Feb. 8-Feb. 19	Calle Herran, Real to H	Malate
23	Mar. 1-Mar. 16	Calle Padre Faura, San Marcelino to Real	Ermita
24	Feb. 15-Feb. 21	Camp Wallace, San Luis to Vidal	do
25	Mar. 1-Mar. 22	Calle Nozaleda, Padre Faura to San Luis	do
26	Mar. 2-Mar. 23	Calle Nozaleda, San Luis to Vidal	do
27	Mar. 11-Mar. 25	Calle Vidal, Nozaleda to Malecon	do
28	Mar. 18-Apr. 6	Calle Vidal, Nozaleda to Concepcion	do
29	Mar. 23-Apr. 4	Calle Solana, Santa Potenciana to Victoria	Intramuros
30	Mar. 23-Apr. 8	Calle Concepcion, Vidal to San Marcelino	Ermita
31	Mar. 24-Apr. 9	Calle Solana, Real to Anda Market	Intramuros
32	Mar. 26-Apr. 8	Calle Solana, Beaterio to Aduana	do
33	Apr. 4-Apr. 16	Calle Santa Potenciana, Solana to Santa Lucia	do
34	Apr. 6-Apr. 21	Calle O'Donnell, Paz to Zurbaran	Santa Cruz
35	Apr. 12-Apr. 21	Calle Santa Lucia, Real to Fundicion	Intramuros
36	Apr. 12-Apr. 22	Calle Zurbaran, Timbugan to Felix Huertas	Santa Cruz
37	Apr. 15-Apr. 19	Calle Fundicion, Santa Lucia to Puerta Real	Intramuros
38	Apr. 18-Apr. 29	Calle Timbugan, Paz to Alvarez	Santa Cruz
39	Apr. 19-Apr. 26	Calle Victoria, Santa Lucia to Palacio	Intramuros
40	Apr. 21-Apr. 29	Calle Victoria, Concepcion to Solana	do
41	Apr. 27-May 7	Calle Cervantes, Paz to Zurbaran	Santa Cruz
42	Apr. 29-May 7	Calle Real, Cabildo to Palacio	Intramuros
43	May 1-May 9	Calle Palacio, Real to Santa Potenciana	do
44	Apr. 30-May 16	Calle Lope de Vega, O'Donnell to Oroquieta	Santa Cruz
45	May 2-May 23	Calle Oroquieta, Mayhaligue to Bambang	do
46	May 8-May 13	H Street, Third Avenue to Calle San Andres	Malate
47	May 13-May 25	Calle Gallera, Nueva to San Jose	Ermita
48	May 14-May 26	Calle San Jose, San Luis to Gallera	do
49	May 18-May 27	Calle San Luis, Real to San Jose	do
50	May 20-June 5	Calle Magdalena, Izquierdo to Timbugan	Binondo
51	May 24-June 7	Calle Marina, San Luis to Divisoria; Divisoria, Marina to Real	Ermita
52	June 2-June 18	Calle Santa Monica, Paz to Moriones	Tondo
53	June 4-June 10	Calle Anda, San Juan de Letran to Cabildo	Intramuros
54	June 8-June 21	Calle Escolta, Puente España to Plaza Moraga, to Plaza Cervantes, to Anloague, to Olivares	Binondo
55	June 13-June 30	Calle Moriones, Lemery to Santa Maria	Tondo
56	June 18-June 30	Plaza Moraga, Escolta to Muelle, to Carenero, to Plaza Cervantes	Binondo
57	June 21-June 30	Plaza Goiti, Carriedo to Santa Cruz Bridge	Santa Cruz
Total			

¹ Includes 4-inch connection to Exposition Buildings.² 1 hydrant Type B reset; error in item of transportation; includes 4-inch connection to Exposition Buildings.³ Deep and difficult excavation.⁴ Main relief to port works; deep and difficult excavation; 2 hydrants Type B reset.⁵ 1 hydrant Type B reset.⁶ Hydrants Type A reset.⁷ Main relief to Intramuros.⁸ Main supply to Binondo; 1 hydrant Type A and 1 hydrant Type C reconnected.⁹ Double installation on boulevard.

pipe lines during the fiscal year 1904.

Length and size of pipe, including hydrant connections.								Number and type of fire hydrants.		
3 inch.	4 inch.	5 inch.	6 inch.	8 inch.	9 inch.	10 inch.	12 inch.	A.	B.	C.
	P13.27		P23.23	P219.78				2	1	
	187.32		12.58					1		
	4.38		5.22					2		
P26.65	64.07	P189.77								
83.04										
86.86										
	43.72		560.00					3		
			40.78	481.04				6		
			474.52					2		
			26.67	236.49				1		
	101.35	3.28	40.46	547.64				5		
	61.37		64.32	23.30		P916.26		8	1	
	410.96									
	4.25		531.46					2		
	5.00		5.00	504.17				2		
			16.47	540.55				1	2	
	9.33		625.13	21.97				2	1	
	8.75		131.37	35.46		9.44		1		
	22.77		18.89	1.99		363.54		1		
	13.76		129.91					1		
	411.53		171.66	15.54			P80.11	2		
	381.09		481.61					3		
			6.82							
			492.14	2.96		23.75		4		
	109.30									2
	295.41		679.76							1
	1.70		171.62							1
			3.97							1
			121.50	10.76		281.76		1	1	1
	.80		2.00	9.34	P81.84	330.24				1
			1.79	134.96						1
	9.85		248.10							
	.92		524.93					1		
			189.98						1	
			197.29							1
	8.85		321.32							2
	.30		105.16							
	34.05	2.27	851.34					2		3
	727.45									
	20.40		413.65					1		2
	262.21									
			31.59				316.65	1		3
	325.75		279.14	1.03					1	1
	1.85		221.83							1
	4.14		20.72				71.90			1
196.55	3,545.90	195.32	8,243.93	2,786.98	81.84	1,924.99	468.66	55	8	21

TABLE No. 13.—*Cost of installing pipe lines*

Pipe instal- lation No.	Date.	Location.	Number of public hydrants.	Number and size of valves.					
				3 inch.	4 inch.	6 inch.	8 inch.	10 inch.	12 inch.
	1903.								
12	Aug. 11-Aug. 17	Calle Herran, H Street to K Street					1		
13	Oct. 7-Oct. 9	Calle Arquiza, dead end to Calle Padre Faura							
14	Oct. 23-Oct. 27	Calle Lardizabal, extension along east end of street.							
15	Dec. 1-Dec. 4	Arroceros shops, fire connection							
16	Dec. 3-Dec. 5	Calle Cabanas, Real to the bay	1						
	1904.								
17	Jan. 18-Jan. 26	City Hall service connection	1						
18	Jan. 20-Jan. 26	H Street, Herran to Third Avenue			9				
19	Jan. 27-Feb. 3	Calle Herran, K Street to Nozaleda		2					
20	Feb. 4-Feb. 7	Calle San Marcelino, Nozaleda to Herran			3				
21	Feb. 18-Feb. 29	Calle Singalong, Herran to Corazon de Jesus	1		1				
22	Feb. 8-Feb. 19	Calle Herran, Real to H		4	3		2		
23	Mar. 1-Mar. 16	Calle Padre Faura, San Marcelino to Real	2	4	3		2	3	
24	Feb. 15-Feb. 21	Camp Wallace, San Luis to Vidal		2					
25	Mar. 1-Mar. 22	Calle Nozaleda, Padre Faura to San Luis	1		1		2		
26	Mar. 2-Mar. 23	Calle Nozaleda, San Luis to Vidal							
27	Mar. 11-Mar. 25	Calle Vidal, Nozaleda to Malecon		2	1				
28	Mar. 18-Apr. 6	Calle Vidal, Nozaleda to Concepcion			1		1		
29	Mar. 23-Apr. 4	Calle Solana, Santa Potenciana to Victoria		1	1				
30	Mar. 23-Apr. 8	Calle Concepcion, Vidal to San Marcelino		1	1		2		
31	Mar. 24-Apr. 9	Calle Solana, Real to Anda Market		2	1				
32	Mar. 26-Apr. 8	Calle Solana, Beaterio to Aduana			1				
33	Apr. 4-Apr. 16	Calle Santa Potenciana, Solana to Santa Lucia		2					
34	Apr. 6-Apr. 21	Calle O'Donnell, Paz to Zurbaran			3				
35	Apr. 12-Apr. 21	Calle Santa Lucia, Real to Fundicion			3				
36	Apr. 12-Apr. 22	Calle Zurbaran, Timbugan to Felix Huertas	2		5				
37	Apr. 15-Apr. 19	Calle Fundicion, Santa Lucia to Puerta Real							
38	Apr. 18-Apr. 29	Calle Timbugan, Paz to Alvarez	2	1	2				
39	Apr. 19-Apr. 26	Calle Victoria, Santa Lucia to Palacio			1				
40	Apr. 21-Apr. 29	Calle Victoria, Concepcion to Solana							
41	Apr. 27-May 7	Calle Cervantes, Paz to Zurbaran			2		1		
42	Apr. 19-May 7	Calle Real, Cabildo to Palacio					1		
43	May 1-May 9	Calle Palacio, Real to Santa Potenciana					1		
44	Apr. 30-May 16	Calle Lope de Vega, O'Donnell to Oroquieta			1				
45	May 2-May 23	Calle Oroquieta, Mayhaligue to Bambang	1		2				
46	May 8-May 13	H Street, Third Avenue to Calle San Andres			1				
47	May 13-May 25	Calle Gallera, Nueva to San Jose			2				
48	May 14-May 26	Calle San Jose, San Luis to Gallera		2					
49	May 18-May 27	Calle San Luis, Real to San Jose			1				
50	May 20-June 5	Calle Magdalena, Izquierdo to Timbugan	2	1	2				
51	May 24-June 7	Calle Marina, San Luis to Divisoria; Divisoria, Marina to Real.		2					
52	June 2-June 18	Calle Santa Monica, Paz to Moriones	2		1				
53	June 4-June 10	Calle Anda, San Juan de Letran to Cabildo		1					
54	June 8-June 21	Calle Escolta, Puente de España to Plaza Moraga, to Plaza Cervantes, to Anloague, to Olivares.			3				2
55	June 13-June 30	Calle Moriones, Lemery to Santa Maria			3	2			
56	June 18-June 30	Plaza Moraga, Escolta to Muelle, to Carenero to Plaza Cervantes.							
57	June 21-June 30	Plaza Goiti, Carriedo to Santa Cruz Bridge		1					12
Total			14	2	34	54	15	7	14

during the fiscal year 1904—Continued.

Cost of work.				Percentages of total cost.		
Labor.	Transportation.	Materials.	Total.	Labor.	Transportation.	Materials.
₧274.94	₧40.00	₧2,287.30	₧2,602.24	10.56	1.54	87.90
129.43		641.80	771.23	16.73		83.27
158.50		851.16	1,009.66	15.69		83.31
82.22		195.98	278.20	29.57		70.43
43.69		186.38	230.07	18.99		81.01
68.23		172.25	240.48	28.37		71.63
395.85	59.38	3,948.55	4,403.78	8.99	1.35	89.66
780.33	76.32	5,894.61	6,751.26	11.57	1.13	87.30
452.35	22.72	3,312.62	3,787.69	11.96	.60	87.44
220.82	40.16	1,964.11	2,225.09	9.92	1.80	88.28
923.67	91.88	5,513.20	6,528.75	14.15	1.41	84.44
825.67	8.81	12,672.34	13,506.82	6.11	.65	93.24
191.62	25.20	1,518.69	1,735.51	11.04	1.45	87.51
926.89	33.54	3,197.11	4,157.54	22.05	.78	77.17
745.92	35.25	3,911.33	4,692.50	15.89	.85	83.26
663.75	28.63	2,707.14	3,399.52	19.53	.84	79.63
415.70	40.52	4,319.59	4,775.81	8.70	.85	90.45
222.47	13.42	1,454.46	1,690.35	13.16	.80	86.04
937.70	18.02	3,748.19	4,703.91	19.93	.38	79.69
207.75	6.36	1,062.86	1,276.97	16.27	.50	83.23
235.14	18.02	2,241.73	2,494.89	9.42	.72	89.84
367.20	16.26	1,598.86	1,982.32	18.53	.82	80.65
483.73	25.80	2,974.61	3,484.14	13.89	.74	85.37
371.90	9.54	937.86	1,219.30	30.51	.78	68.71
577.11	22.26	3,740.47	4,339.84	13.30	.51	86.19
76.75	6.36	227.68	310.79	24.68	2.05	73.27
932.90	47.70	4,787.56	5,758.16	16.19	.83	82.97
180.30	6.36	1,200.54	1,387.20	13.00	.46	86.54
400.05	15.90	2,944.39	3,360.34	11.91	.47	87.62
1,248.55	60.42	5,043.64	6,352.61	19.66	.95	79.39
245.55	9.54	841.75	1,096.84	22.29	.87	76.84
218.55	9.54	1,138.32	1,366.41	16.07	.70	83.23
257.12	9.54	1,358.81	1,627.47	15.82	.59	83.59
439.91	39.58	2,991.01	3,470.50	12.68	1.13	86.29
251.20	12.72	1,221.01	1,484.93	16.91	.86	82.23
249.98	12.72	1,423.09	1,685.79	14.83	.76	84.41
237.20	15.80	2,115.52	2,368.52	10.06	.67	89.27
166.84	6.36	737.74	910.94	18.31	.70	80.99
1,138.16	53.00	5,311.86	6,503.02	17.35	.82	81.83
512.40	4.71	1,622.64	2,139.75	23.95	.22	75.83
861.11	44.52	2,715.20	3,620.83	23.78	2.08	74.14
319.89	9.54	624.71	954.14	33.54	1.00	65.46
1,051.01	38.16	4,676.29	5,765.46	18.23	.66	81.11
835.59	65.02	2,915.78	3,816.39	21.89	1.70	76.41
497.91	15.90	1,290.50	1,804.31	27.60	.88	71.52
418.61	26.86	1,461.17	1,906.64	21.95	1.40	76.65
21,242.16	1,142.34	117,702.41	139,976.91	15.18	.82	84.00

TABLE No. 14.—*Cost of installation of post and sprinkling fire hydrants, fiscal year 1904.*

[Numbers in last column refer to pipe installations, extension of new water system. Cost of installation is included under cost of pipe extensions.]

No.	Date of installation.	District.	Location.	Type.	Original cost.	Repairs.		No.
						Date.	Cost.	
7	1903. Aug. 11	Malate	Calle Herran between hydrant No. 8 and estero.	A.				12
8	do	do	Calle Herran between Market and hydrant No. 7.	A.				12
9	do	do	Calle Herran between estero and Pao Bridge.	B.				12
10	Aug. 19	Ermita	Corner Maria Cristina and Vidal.	B.	P260.22			
11	Sept. 21	do	Corner Vidal and Puerta Real.	B.	380.48			
12	do	do	Calle Vidal in front Concepcion.	B.	232.87			
13	do	do	Calle Nozaleda in front fire station.	B.	160.06			
14	Sept. 22	do	Corner Arroceros and Colgante Bridge.	A.	116.09			
15	Sept. 23	Dilao	Calle Canonigo in front Tabacalera factory.	B.	107.87			
16	Sept. 24	do	Corner San Marcelino and Canonigo.	B.	116.56			
17	do	Ermita	Corner Concepcion and San Marcelino.	B.	185.22			
18	Sept. 26	do	Calle Padre Faura in front Exposition.	B.	160.41			
19	Sept. 25	do	Calle Nozaleda in front San Luis Bridge.	B.	279.02			
20	do	Intramuros	Calle Victoria, corner Mercado.	B.	125.04	May 4	P11.94	
21	Sept. 27	do	Corner Calles Cabildo and Anda.	B.	199.11			
22	do	do	Calle San Juan de Letran, corner Real.	B.	161.69			
23	do	Dilao	Calle Real, corner Union.	B.	125.40			
24	Sept. 28	Quiapo	Plaza Miranda, corner San Pedro.	¹ B.	195.99	May 9	12.24	
25	do	San Miguel	Calle Malacanang next to house No. 186.	B.	132.91			
26	Sept. 30	Quiapo	Calle Iris, corner Lepanto.	B.	158.51			
27	Oct. 1	Ermita	Calle Arroceros in front of city shops.	A.	120.58			
28	do	do	Calle Arroceros in front Military Hospital.	A.	114.65			
29	do	do	Calle Arroceros in front Estado Mayor.	A.	173.38			
30	do	do	Calle Concepcion, corner Arroceros.	A.	117.93			
31	Oct. 3	San Miguel	Calle San Miguel in front of Ayala distillery.	A.	110.41			
32	do	do	Calle San Miguel, corner Ayala Bridge.	A.	118.04			
33	Oct. 2	do	Calle San Miguel in front of house No. 238.	A.	117.41			
34	do	do	Calle San Miguel, corner San Agustin.	A.	132.07			
35	do	do	Calle San Miguel in front of house No. 270.	A.	144.09			
36	Oct. 3	Santa Cruz	Calle San Pedro, corner Curtidor.	A.	118.57			
37	do	do	Calle San Pedro, between Curtidor and Centeno.	A.	114.32			
38	do	do	Calle San Pedro, corner Centeno.	A.	123.63			

¹Changed from B to A.

TABLE No. 14.—*Cost of installation, etc.*—Continued.

[Numbers in last column refer to pipe installations, extension of new water system. Cost of installation is included under cost of pipe extensions.]

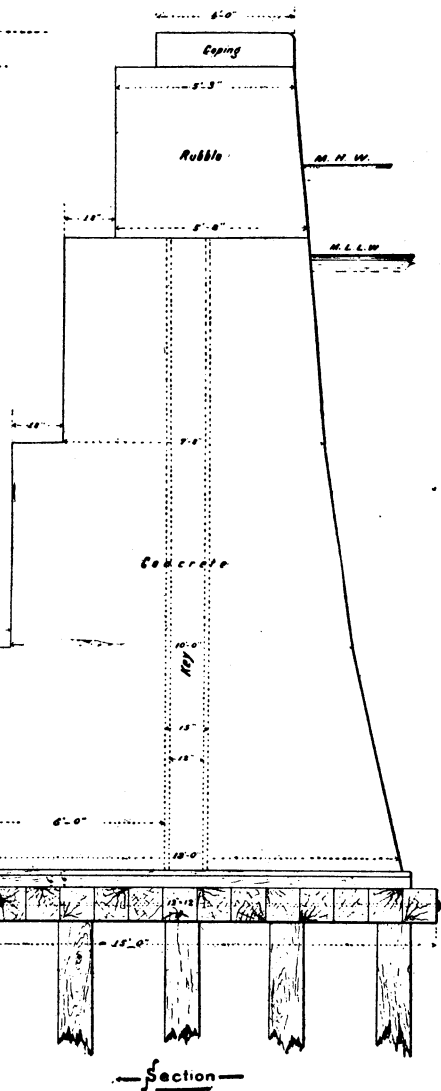
No.	Date of installation.	District.	Location.	Type.	Original cost.	Repairs.		No.
						Date.	Cost.	
39	Oct. 3	Santa Cruz	Calle San Pedro, corner Noria.	¹ A.	P166.99	May 1, 4	P12.24	-----
40	Oct. 5	Quiapo	Calle Concepcion in front Noria.	A.	132.86	-----	-----	-----
41	do	Sampaloc	Calle San Anton in front Bustillos.	A.	203.48	-----	-----	-----
42	do	Quiapo	Calle Concepcion, corner Raon.	A.	70.63	-----	-----	-----
43	Oct. 6	Tondo	Calle Ilaya, corner Padre Rada.	A.	130.89	-----	-----	-----
44	do	do	Calle Ilaya, corner Santa Elena.	A.	110.51	-----	-----	-----
45	do	do	Calle Ilaya, in front of house No. 93.	A.	112.20	-----	-----	-----
46	do	do	Calle Padre Herrera, corner Ilaya.	A.	166.97	-----	-----	-----
47	Oct. 9	Ermita	Calle Arquiza between Padre Faura and Isaac Peral.	A.	-----	-----	-----	13
48	Oct. 10	Tondo	Calle Lemery between Penalosa and Pajardo.	A.	127.56	-----	-----	-----
49	do	do	Calle Lemery between Pavia and Pajardo.	A.	117.44	-----	-----	-----
50	do	do	Calle Lemery, corner Moriones.	A.	121.08	-----	-----	-----
51	do	do	Calle Lemery, corner Azcarraga.	A.	125.00	-----	-----	-----
52	Oct. 12	Binondo	Plaza Calderon de la Barca in front of No. 227.	A.	121.87	-----	-----	-----
53	Oct. 13	do	Plaza Calderon de la Barca next Maura Bridge.	A.	115.39	-----	-----	-----
54	Oct. 12	do	Calle Jolo, corner Estrade.	A.	104.10	-----	-----	-----
55	Oct. 15	Santa Cruz	Calle Gandara, corner Lacoste.	A.	129.91	-----	-----	-----
56	do	Binondo	Calle Soler, corner Gandara.	A.	154.14	-----	-----	-----
57	do	do	Calle Benavides, corner General Izquierdo.	A.	174.10	-----	-----	-----
58	do	Santa Cruz	Calle Gandara, corner Espeleta.	A.	132.39	-----	-----	-----
59	Oct. 16	Ermita	Calle Concepcion between Ayala Bridge and San Marcelino.	A.	146.09	-----	-----	-----
60	Oct. 17	do	Calle Concepcion, corner Ayala Bridge.	A.	134.34	-----	-----	-----
61	Oct. 19	Intramuros	Calle Beaterio, corner San Juan de Letran.	A.	144.34	-----	-----	-----
62	do	do	Calle Real, corner Cabildo.	A.	126.07	-----	-----	-----
63	do	do	Calle Real, corner Solana.	A.	134.65	-----	-----	-----
64	do	do	Calle Real, corner Legaspi.	A.	126.27	-----	-----	-----
65	do	do	Calle Real, corner Magallanes.	A.	131.41	-----	-----	-----
66	do	do	Calle San Juan de Letran, corner Anda.	A.	133.35	-----	-----	-----
67	Oct. 27	Sampaloc	Calle Lardizabal	A.	-----	-----	-----	14
68	do	do	Calle Lardizabal in front of house No. 102.	A.	-----	Mar. 16, 4	3.98	14
69	1904. Jan. 8	Dilao	Calle Nozaleda, between houses Nos. 332 and 338.	¹ A.	133.54	May 5, 4	7.64	-----
70	do	Ermita	Calle San Marcelino in front of house No. 28.	A.	136.21	-----	-----	-----
71	do	do	Calle San Marcelino, corner Zobel.	A.	139.86	-----	-----	-----

¹ Changed from A to B.

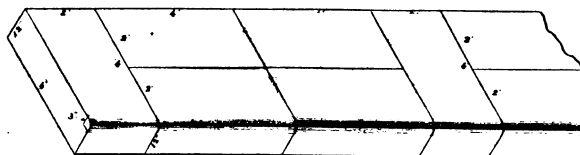
TABLE No. 14.—*Cost of installation, etc.*—Continued.

[Numbers in last column refer to pipe installations, extension of new water system. Cost of installation is included under cost of pipe extensions.]

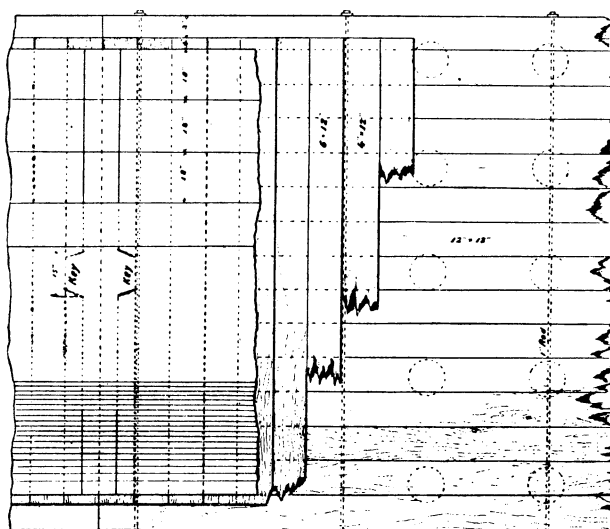
No.	Date of installation.	District.	Location.	Type.	Original cost.	Repairs.		No.
						Date.	Cost.	
72	Jan. 9	Dilao	Calle Nozaleda in front of house No. 416.	A.	P153.00			
73	do	do	Calle San Marcelino	A.	136.79			
74	do	do	Calle San Marcelino	A.	138.24			
75	do	do	Calle San Marcelino	A.	138.39			
76	Jan. 11	Malate	Calle Real	A.	135.83			
77	do	do	Calle Real, corner Cortado.	A.	120.22			
78	do	do	Calle Real, corner San Andrés.	A.	121.58			
79	do	do	Calle Real, corner Remedios.	A.	118.81			
80	Jan. 12	do	Calle Real, corner Santa Monica.	A.	162.57			
81	do	Ermita	Calle Real, corner Padre Faura.	A.	166.09			
82	do	Malate	Calle Real, corner Divisoria.	A.	143.25			
83	do	do	Calle Real, corner Sinagoga.	A.	135.32			
84	Jan. 13	Ermita	Calle San Luis in front of house No. 60.	A.	131.06			
85	do	Intramuros	Paseo Magallanes next to Isabel II Gate.	A.	74.63			
86	do	Ermita	Calle Isaac Peral, corner Real.	A.	149.59	July 6, 4	P3.04	
87	Jan. 14	do	Calle Real, corner Gallera.	A.	153.86			
88	do	do	Calle San Luis, corner San Antonio.	A.	126.50			
89	do	do	Calle San Luis between bridge and San Antonio.	A.	127.50			
90	do	do	Calle Real, corner Plaza del Mercado.	A.	162.02			
91	Jan. 16	San Nicolas	Calle Santo Cristo, corner Market.	A.	168.89			
92	do	do	Calle Santo Cristo in front of house No. 181.	A.	140.80			
93	do	do	Calle Sagunto in front of house No. 297.	A.	140.65			
94	Jan. 14	Tondo	Calle Sagunto, corner Azcarraga.	A.	126.50			
95	Jan. 16	San Nicolas	Calle San Fernando, corner Santo Cristo.	A.	144.72			
96	Jan. 15	do	Calle Santo Cristo, corner Jaboneros.	A.	144.72			
97	do	do	Calle Santo Cristo, corner San Nicolas.	A.	144.72			
98	Jan. 18	Binondo	Plaza Calderon de la Barca in front of house No. 261.	A.	162.55			
99	do	do	Calle Sacristia, corner Malinta.	A.	180.08			
100	do	do	Calle Sacristia, corner Rosario.	A.	177.00			
101	do	Santa Cruz	Calle Arraque, corner Tetuan.	A.	188.37			
102	Jan. 20	do	Plaza Santa Cruz, corner Calle Tetuan.	A.	183.83			
103	do	do	Calle Tetuan, corner Obando.	A.	180.75			
104	Jan. 19	Binondo	Calle Rosario in front of house No. 171.	A.	108.35			
105	do	do	Calle Rosario in front Calle Norzagaray.	A.	108.35			
106	do	do	Calle Rosario, corner Olivares.	A.	108.35			
107	do	do	Plaza Cervantes, corner Rosario.	A.	150.51			
108	Jan. 20	Malate	Calle H, corner First Avenue south.	A.				18
109	do	do	Calle H, corner Second Avenue south.	A.				18



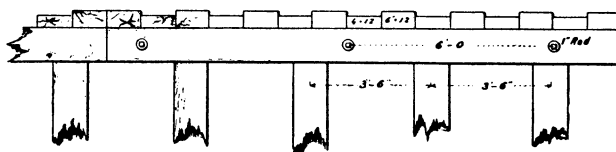
—Section—



—Proposed Plan of Coping—



—Plan—



—Longitudinal Elevation of Timbering—

PLAN AND SECTIONS
OF
PROPOSED RIVER WALL
— July 1903 — — Scale $\frac{1}{2}'' = 1'$ —

Authorized by Act 659 of Philippine Commission
BUREAU OF ENGINEERING
Concurred in as provided for in
sec 3, Act 669, Aug. 11, 1903.
J. W. Standley
Consulting Engineer to
the Commission
Office of City Engineer
J. W. Standley
City Engineer

TABLE No. 14.—*Cost of installation, etc.*—Continued.

[Numbers in last column refer to pipe installations, extension of new water system. Cost of installation is included under cost of pipe extensions].

No.	Date of installation.	District.	Location.	Type.	Original cost.	Repairs.		No.
						Date.	Cost.	
110	Jan. 20	Malate	Calle H, corner Third Avenue south.	A.	-----	-----	-----	18
111	do	Ermita	Calle Suspension, corner Vidal.	B.	-----	-----	-----	18
112	Feb. 8	San Miguel	Calle General Solano, corner Ayala.	A.	P214.53	May 7, 4	P6.44	-----
113	do	do	Calle Ayala, corner Novaliches.	A.	121.86	-----	-----	-----
114	do	do	Calle Tanduay next to the bridge.	A.	153.43	-----	-----	-----
115	Feb. 12	do	Calle General Solano, corner Espinosa.	A.	171.87	-----	-----	-----
116	do	Quiapo	Calle Tanduay in front of house No. 170.	A.	125.74	-----	-----	-----
117	do	do	Calle Tanduay in front of house No. 102.	A.	108.51	-----	-----	-----
118	do	do	Calle Tanduay in front of Vergara.	A.	134.63	May 7, 4	7.64	-----
119	do	do	Calle Tanduay next to pipe bridge.	A.	136.35	-----	-----	-----
120	do	do	Calle Concordia, corner Marquez.	A.	147.32	-----	-----	-----
121	Feb. 13	San Nicolas	Calle San Nicolas, corner Elcano.	A.	149.15	-----	-----	-----
122	do	do	Calle San Nicolas, corner Asuncion.	A.	131.67	-----	-----	-----
123	do	do	Calle Madrid, corner San Nicolas.	A.	173.03	-----	-----	-----
124	do	do	Calle San Nicolas, corner Sevilla.	A.	138.35	-----	-----	-----
125	Feb. 14	do	Calle San Nicolas, corner Principe.	A.	153.63	May 15, 4	3.35	-----
126	do	do	Calle San Nicolas, corner Valderama.	A.	113.32	-----	-----	-----
127	do	do	Calle San Nicolas, corner Vives.	A.	119.71	-----	-----	-----
128	do	do	Calle Del Pan, corner Muelle de la Reina.	A.	124.81	-----	-----	-----
129	Jan. 27	Malate	Calle Herran between Pennsylvania and Colorado.	A.	-----	-----	-----	19
130	Feb. 29	do	Calle Herran between Colorado and San Marcelino.	A.	-----	-----	-----	19
131	Feb. 3	do	Calle Herran between San Marcelino and Kansas.	A.	-----	-----	-----	19
132	do	do	Calle Herran between Kansas and Singalong.	A.	-----	-----	-----	19
133	do	do	Calle Herran between Singalong and hydrant No. 134.	A.	-----	-----	-----	19
134	do	do	Calle Herran between hydrant No. 134 and Paco Bridge.	A.	-----	-----	-----	19
135	Feb. 7	do	Calle California	A.	-----	-----	-----	20
136	do	do	Cal e Oregon	A.	-----	-----	-----	20
137	Feb. 17	do	Calle Herran, corner G Street.	A.	-----	-----	-----	22
138	do	do	Calle Herran, corner F Street.	A.	-----	-----	-----	22
139	Feb. 19	do	Calle Herran, corner E Street.	A.	-----	-----	-----	22
140	do	do	Calle Herran, corner D Street.	A.	-----	-----	-----	22
141	do	do	Calle Herran, corner Nueva.	A.	-----	-----	-----	22
142	Mar. 16	Ermita	Calle Padre Faura, corner Nueva.	A.	-----	-----	-----	22
143	do	do	Calle Padre Faura, the second beginning hydrant No. 142.	A.	-----	-----	-----	23

¹ Changed from A to B.

TABLE No. 14.—*Cost of installation, etc.—Continued.*

[Numbers in last column refer to pipe installations, extension of new water system. Cost of installation is included under cost of pipe extensions.]

No.	Date of installation.	District.	Location.	Type.	Original cost.	Repairs.		No.
						Date.	Cost.	
144	Mar. 16	Ermita	Calle Padre Faura, the third beginning hydrant No. 142.	A.				23
145	do	do	Calle Padre Faura, the fourth beginning hydrant No. 142.	A.				23
146	do	do	Calle Padre Faura, the sixth beginning hydrant No. 142.	A.				23
147	do	do	Calle Padre Faura, the seventh beginning hydrant No. 142.	A.				23
148	do	Dilao	Calle Padre Faura, the eighth beginning hydrant No. 142.	A.				23
149	do	do	Calle Padre Faura, the ninth beginning hydrant No. 142.	A.				23
150	Mar. 22	do	Calle Nozaleda, corner Gonzalez.	A.				25
151	do	do	Calle Nozaleda between Gonzalez and San Luis.	A.				25
152	Mar. 23	Ermita	Calle Nozaleda between bridge and hydrant No. 153.	A.				26
153	do	do	Calle Nozaleda between hydrant No. 152 and Vidal.	A.				26
154	Mar. 25	do	Calle Vidal in front of military barracks.	A.				27
155	Apr. 6	do	Calle Vidal in front of headquarters Post of Manila.	A.				28
156	do	do	Calle Vidal	A.				28
157	Apr. 4	Intramuros	Calle Solana in front Santa Potenciana.	A.				29
158	Apr. 9	do	Calle Solana, corner Anda.	A.				31
159	Apr. 8	do	Calle Solana, corner Beaterio.	A.				32
160	do	do	Calle Solana in front of University.	A.				32
161	Apr. 21	Sta. Cruz	Calle Paz, corner O'Donnell.	A.				34
162	do	do	Calle O'Donnell, the first beginning Calle Paz.	A.				34
163	do	do	Calle O'Donnell, the second beginning Calle Paz.	A.				34
164	do	do	Calle Timbugan, corner Zurbaran.	A.				36
165	do	do	Calle Cervantes, corner Zurbaran.	A.				36
166	do	do	Calle Oroqueta, corner Zurbaran.	A.				36
167	do	do	Calle Felix Huertas corner.	A.				36
168	Apr. 20	Intramuros	Paseo Maria Cristina in front of Santa Lucia Gate.	B.	P213.55			
169	Apr. 24	Binondo	Calle Escolta, corner Plaza del Padre Moraga.	C.	270.00			
170	do	do	Calle Escolta, corner España Brige.	C.	193.71			
171	do	do	Calle Escolta in front of house No. 62.	C.	212.79			
172	do	do	Calle Escolta in front of house No. 89.	C.	216.19			
173	do	do	Pasaje de Perez, corner Calle Escolta.	C.	247.23			
174	do	do	Calle Escolta, corner David.	C.	235.63			
175	Apr. 29	Sta. Cruz	Calle Timbugan, corner Alvarez.	C.				38
176	Apr. 26	Intramuros	Calle Victoria in front of Basco.	C.				39

TABLE No. 14.—*Cost of installation, etc.*—Continued.

[Numbers in last column refer to pipe installations, extension of new water system. Cost of installation is included under cost of pipe extensions.]

No.	Date of installation.	District.	Location.	Type.	Original cost.	Repairs.		No.
						Date.	Cost.	
177	May 1	Santa Cruz	Plaza de Goiti, corner Calle Dulumbayan.	C.	P 253.69			
178	do	do	Esterio Cegado, corner Calle Carriedo.	C.	257.17			
179	do	do	Calle San Roque, corner Carriedo.	C.	263.30			
180	do	Quiapo	Calle Palma, corner Carriedo.	C.	275.00			
181	do	do	Plaza Miranda, end of Calle Santa Rosa.	C.	249.31			
182	May 3	do	Calle Concordia in front of fire station.	C.	190.97			
183	do	do	Calle San Sebastian in front of house No. 196.	A.	96.33			
184	do	do	Calle San Sebastian in front of house No. 254.	A.	95.52			
185	Apr. 25	Santa Cruz	Calle Timbugan, corner Requesens.	C.				38
186	May 2	do	Calle Oroquieta, corner Requesens.	A.				45
187	May 13	Malate	Calle H, corner San Andres.	B.				46
188	May 25	Ermita	Calle Gallera, corner Nueva.	C.				47
189	May 26	do	Calle San Jose, corner Isaac Peral.	C.				48
190	do	do	Calle San Jose, corner Gallera.	C.				48
191	June 5	Binondo	Calle Magdalena, corner General Izquierdo.	C.				50
192	do	do	Calle Magdalena, corner Luzon.	A.				50
193	do	do	Calle Magdalena, corner Latorre.	C.				50
194	do	do	Calle Magdalena, corner Diaz.	A.				50
195	do	do	Calle Magdalena between hydrant No. 194 and bridge.	A.				50
196	Feb. 25	Dilao	Calle Singalong.	A.				21
197	Apr. 27	Intramuros	Calle Victoria, corner Escuela Municipal.	C.				40
198	May 1	Santa Cruz	Calle Cervantes, corner Paz.	B.				41
199	May 3	do	Calle Cervantes between Paz and Lope de Vega.	A.				41
200	May 5	do	Calle Cervantes, corner Lope de Vega.	C.				41
201	do	Intramuros	Calle Real, corner Palacio.	C.				42
202	May 7	do	Calle Palacio, corner Sta. Potenciana.	C.				43
203	June 2	Tondo	The first hydrant beginning Calle Azcarraga.	C.				52
204	do	do	The second hydrant beginning Calle Azcarraga.	A.				52
205	do	do	The third hydrant beginning Calle Azcarraga.	C.				52
206	June 8	Binondo	Plaza Cervantes, corner Carenero.	C.				54
207	do	do	Calle Olivares, corner Anioague.	C.				54
208	June 13	Tondo	Calle Moriones between Santa Maria and Sande.	B.				55
209	do	do	Calle Moriones, corner Sande.	C.				55
210	June 18	Binondo	Muelle del Rey, corner Carenero.	C.				56
211	June 21	Santa Cruz	Plaza de Goiti, corner Echague.	C.				57

RECOMMENDATIONS.

NEW YARD.

The question of yard room is becoming serious. The present yard, while in many particulars convenient, is, from its restricted size and distance from the work to be undertaken in the coming year, bound to cause a great expense in the item of transportation. The total area available for the storage of water pipe and sewer materials is only about 1,000 square meters. A proportion of this must, moreover, be thrown into roads for the proper handling of materials, so that the net area for storage does not exceed 800 square meters. An additional yard in the district of San Miguel is recommended for purchase (1) as a relief to the yard at the Arroceros shops, (2) as a depot for the storage of materials for work in the districts north of the Pasig, and (3) for the sake of economy in transportation. To be of any great utility the yard must abut on the river.

REPAIR SHOPS.

The building allotted for repair shops serves a double purpose as shop and as storeroom, this latter occupying about one-third of the floor area, or about 100 square meters. There is absolutely no opportunity to install power machinery, and shop repairs are now at least 50 per cent more expensive than they would be under favorable conditions. In a water supply it is imperative that a large and well-arranged stock of materials be always kept so that workmen may be promptly despatched in case of accident. The stock is in such a mixed state that the outlook is very discouraging. As many as 50 to 100 requisitions for tools and materials are daily filled, so it is seen that the best system of accounting should be in force. In this building, which contains a blacksmith shop, drill presses, and the meter testing and repair shops, the storekeeper is required to make his entries, to prepare bills for plumbing service, cost sheets and record cards, and to check all workmen's rolls, daily work sheets, and expenditures of materials. That it is impossible to secure the most favorable results is clear.

It is strongly recommended that a new shop be allotted to the water supply. The building now occupied by the Forestry Bureau as a timber-testing laboratory furnishes all the requirements for shop purposes and should be at once secured for this office.

NEW FIRE HYDRANTS.

The experience with the last shipment of fire hydrants, which were almost eleven months in delivery, has conclusively shown that it is most unsatisfactory to place orders for such material in the United States.

Two of the new sprinkling post hydrants were broken off near the low-lying valves in accidents, and the hydrants temporarily suppressed because no extra parts were carried in stock. These hydrants are patented articles, duplication of which in the local shops might lead to legal difficulties. It has also been shown that the present hydrants have several parts which are not necessary in this climate, particularly the low-lying valve and the drip. An accident to any part of the hydrant makes necessary a complete removal of the hydrant, with long interruption of the service. For the above reasons a design for an improved hydrant, prepared in this office, suited to the conditions in Manila, is submitted with recommendation that it be adopted for all future installations in the fire service. The proposed hydrant possesses the following qualities to warrant its adoption:

- (1) A clear 6-inch opening from the street main to the ports, without expensive low-lying valve and valve stems.
- (2) A strong casing in two parts united by bolts above the sidewalk surface. The upper portion may be replaced in a few minutes without disturbing the sidewalk.
- (3) The gates to the ports entirely independent of each other, and of a form easy of manufacture and adjustment.
- (4) No liability to clogging, as there are no projections in the barrel and no moving parts to interfere.
- (5) Cheapness. It may be manufactured for less than the price now paid, even though much stronger than the hydrants now in operation.
- (6) Ease and cheapness of installation, with no delicate adjustment.
- (7) No repairs to be made except an occasional grinding of the gates or repacking of the head.
- (8) It is not necessary to carry a large number in stock, with consequent reduction in interest and less liability to accident in storage. The contractors could furnish hydrants in quantities as required.
- (9) The hydrant may be converted into a sprinkling post without the use of complicated machinery, and at small expense.

LABOR.

There has been great difficulty in securing competent labor because of the small wages which the Office has been able to offer and the competition of the railway company. Difficulty has also been encountered in the matter of overtime and additional pay for extraordinary work. This difficulty has, in part, been met by a general increase in wages to the skilled laborers, but the system can not be approved for economical reasons. In some cases men have been kept at important work for from twenty to twenty-four hours, and the Office has been at its wit's end to distribute the time so that the workmen may not be losers. The solu-

tion with ordinary labor has been easy, but with the skilled pipemen and mechanics, whose number is strictly limited, no scheme to satisfy all conditions has been evolved.

Generally the services of the monthly employees has been satisfactory, but it is desired to mention those of Gaudencio Quisumbing, foreman, as worthy of the highest commendation. In conjunction with his difficult duties as storekeeper during the six months from January to June he assumed the position of general foreman in charge of distribution. In this time there were despatched from the yards some ₱150,000 of materials without delays or losses, and an immense amount of repair work carried to completion. He was personally responsible for the conduct of some 500 men, and his energy was remarkable.

Very respectfully,

ROBT. J. DIECK,

Superintendent of Water Supply and Sewers.

The ACTING CITY ENGINEER,

Manila, P. I.

REPORT OF BOILER INSPECTOR.

MANILA, *October 22, 1904.*

SIR: The inspection of boilers for the year was discontinued until March, 1904, awaiting the arrival of an inspector of boilers from America. Upon the arrival the boiler inspection was commenced at once and prosecuted throughout the year. In all there were inspected 10 gasoline motors, 9 petroleum motors, and 95 steam boilers, aggregating 3,354.5 horsepower.

In general it may be stated that the ordinance covering the boiler inspection is insufficient to meet the present needs, being incorporated in the general building ordinance. The principal defect is the lack of technical clauses. It is impossible to fix definitely the responsibility for any defects, and there is no clause which provides for neglect to obey the instructions of the boiler inspector. It is believed also that there should be a registry of engineers, to which registry persons desiring to practice the trade of steam engineer should be admitted only after a suitable practical examination.

The inspections necessary do not require the entire time of the boiler inspector, and it is intended to use him as an inspector of machinery for the city of Manila.

Very respectfully,

ROBERT J. DIECK.

The ACTING CITY ENGINEER,

Manila, P. I.

REPORT OF SUPERINTENDENT OF BUILDINGS AND PLUMBING INSPECTION.

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS,

Manila, P. I., September 28, 1904.

SIR: I have the honor to submit herewith report of the work carried on under the direction of this office for the fiscal year ending June 30, 1904.

The supervision of public and rented buildings during the fiscal year 1904 has been carried on very satisfactorily and the general condition has greatly improved over the previous year, it having been possible for the department to make a number of changes in rented buildings wherein better classes were procured. The total cost of supplies for cleaning and caring for public and rented buildings was ₱5,178.14.

The total cost of labor for cleaning and caring for public and rented buildings was ₱34,680.70, making a total cost for supplies and labor of ₱39,858.84. The above for labor does not include classified employees, which amounts to ₱6,340.

The following statement will show the lands and buildings rented by the city in the past year, and for what purposes used:

Rentals for the year:

For school purposes	25
For police purposes	7
Land Registration Court and Register of Deeds	1
Superintendent of cemeteries	2
Residence of City Engineer	1
Residence of engineer of new sewer system	1
Land for crematory site	1
Land for school site	1
Land for market	2
Storehouse	1
Total	42

New buildings rented during the fiscal year 1904:

For school purposes	12
For police purposes	4
For school site	1
Land Registration Court and Register of Deeds	1
Engineers' residences	2
Market sites	2
Total	22

Buildings vacated during the fiscal year 1904:

Schools	9
Police	2
Land Registration Court	1
Engineer's residence	1

13

Total amount paid in rentals for the fiscal year 1904, was ₱62,293.91.

The following statement will show the entire rents in the city, by districts, for the fiscal year 1904:

Binondo.....	₱3,080.00
San Nicolas.....	3,600.00
Tondo.....	6,690.00
Santa Cruz.....	7,984.58
Quiapo.....	135.00
San Miguel.....	2,000.00
Sampaloc.....	13,480.00
Intramuros.....	8,450.00
Ermita.....	9,780.00
Malate.....	560.00
Paco.....	2,084.33
Pandacan.....	1,000.00
Santa Ana.....	760.00
Trozo.....	1,950.00
Gagalangin.....	80.00
Singalong.....	660.00
Total.....	62,293.91

REPAIRS AND ALTERATIONS TO PUBLIC BUILDINGS.

Municipal School Building, Calle Victoria: General overhauling of sanitary fixtures; installed large 500-gallon water tank; installed flagstaff; installed necessary partitions for accommodation of school; interior and exterior of entire building painted; total cost of repairs, ₱4,496.98.

Gagalangin school: Installed water-closet; made minor repairs to roof and door and put in two partitions; total cost, ₱196.85.

Malate school buildings: General overhauling of buildings; interior and exterior painted; installed 2 new water-closets; placed portable partitions in 2 large rooms; total cost, ₱1,607.48.

American school: Removed 2 partitions; installed flagstaff; made platform; installed 5 awnings over windows; total cost, ₱95.33.

Plaza Santa Ana secondary school: Installed 5 partitions; made 4 portable partitions; built platform; total cost, ₱352.25.

Binondo secondary school: Installed flagstaff; cost, ₱12.96.

Sampaloc Grammar school: Installed and painted partitions; made screens for closets; total cost, ₱21.63.

Quiapo boys' school: Installed and painted partitions; made general repairs to closets; placed temporary roof over court; repairs to floor; total cost, ₱181.59.

Concepcion school: Installed partitions; cost, ₱16.30.

San Miguel school: Made and installed flagstaff, cost, ₱10.46.

Headquarters, school department: Repairs to furniture; cost, ₱13.88.

Warehouse, school department: Repairs to floors, toilets, furniture; painting interior; installing partitions and shelving; total cost, ₱408.48.

Police Department headquarters: Repairs to office furniture; made 32 benches for police stations; made 3 stepladders; made 6 targets for target practice; total cost, ₱385.27.

Storehouse, Police Department: General overhauling of building; made index card case; installed necessary shelving; total cost ₱252.75.

Mounted detachment: Installed shower baths; made stalls for animals; made rack for hay and saddles; made rain box; total cost, ₱121.15.

Parian police station, Metropolitan: Installed railing in office; made partitions in jails; repairs to stalls and stable; repairs to cells; repairs to office furniture; cleaning and whitewashing cells; total cost, ₱347.09.

Sampaloc police station, Metropolitan: Installed railing in office; made improvements to mess hall; total cost, ₱163.62.

This station has been thoroughly overhauled by the owner, new electric lights installed, building painted, interior and exterior, and new water-closets installed.

San Fernando police station, Metropolitan: General overhauling of water-closets; shelving for store rooms; repairs to stable; total cost, ₱665.78.

Paco police station, native: Installed baths and water-closets; placed iron awning entirely around building over windows of upper and lower floor; minor repairs to ceilings and roof; total cost, ₱1,302.33.

Malate police station, native: General repairs and painting; cost, ₱201.18.

Anloague police station, native: General repairs and painting; cost, ₱188.84.

Tondo police station, native: Repairs to cells; screens for closets; total cost, ₱48.36.

Secret service: Repairs to office furniture; made four filing cases; put in two partitions and subdivided part of same into cells; total cost, ₱286.01.

Santa Cruz fire and police station: General overhauling and repairs of building; entirely overhauled water-closets; partitioned off room for City Electrician; made and installed flagstaff; made and installed 70 lockers; built shed for blacksmith shop; installed 500-gallon supply tank for closets; changed drainage of the court; relaid flagstone in court; total cost, ₱4,770.

San Nicolas fire station: Building shed in rear and painting same; repairs to closets; repairs to roof; painted stalls; installed 500-gallon supply tank for closets; made 2 benches for park; cut and installed windows in tower; total cost, ₱964.24.

Audiencia fire station: Repairs to closets; made backstop for hand-ball court; total cost, ₱87.32.

Paco fire station: Repairs to roof; made and installed feed boxes (portable); general repairs to interior of buildings; built new cesspool and overhauled water-closets; built shed for coal and wagon; built settling basin; total cost, ₱1,096.68.

Tanduay fire station: Made pipe and connections for heater; installed necessary weight boxes; made and installed swinging screen doors for all closets, urinals, and bath; made 20 lockers; made connections of down spouts to drains; total cost, ₱326.02.

Storehouse, Fire Department: Relaid floor with 2-inch plank; general cleaning of interior; total cost, ₱463.32.

City stable No. 1: Installed floors and down spouts; laid floor in stable; constructed 35 pony stalls and mangers; general repairs to water-closets; repairs to roof; total cost, ₱855.68.

City stable No. 2: General overhauling and extension of stable; repairs to water pipes and closets; large buildings painted; built stone blacksmith shop; laid flooring with 2-inch plank and cement in old stable; made shelving for storeroom; put new roof on old stable; total cost, ₱12,880.86.

Anda Street market: Repairs to closets and roof; painted interior and exterior of office and superintendent's quarters; total cost, ₱102.88. Quinta market: Repairs to roof; painted interior and exterior of office and superintendent's quarters; made garbage cans; repairs to closets; repairs to floor; total cost, ₱560.11.

Divisoria market: Made garbage cans; general repairs to closets; repairs to floor; total cost, ₱286.88.

Sampaloc market: Constructed cement floor for entire market; made 8 garbage cans; repairs to water pipes; repairs to closets; total cost, ₱773.45.

Arranque market: Repairs to floor; repairs to closets; furnished 16 garbage cans; total cost, ₱86.48.

Herran market: Built new midden shed; made 8 garbage cans; installed settling basin; repairs to water pipes and drains; total cost, ₱460.21.

Luneta band stands: Repainted both stands; repairs to roof; repairs to posts; total cost, ₱235.30.

Binondo band stand: Built and painted band stand; installed electric lights; total cost, ₱2,403.66.

Internal Revenue Building, Calle Anloague: General overhauling of entire building, including City Assessor and Collector and Police Departments; installed new counters with wire screens throughout entire building; painted interior and exterior of building; total cost, ₱6,657.73.

Court of First Instance: Installed and painted partitions in clerk's

office; repairs to closets; made platforms for two courts; total cost, ₱88.81.

Department of Engineering and Public Works: General repairs to furniture under the various offices of the department; made 3 drafting tables for drafting room; made filing cases for drafting room; necessary stakes for surveying; made 8 desks, and all other necessary incidentals required for the operation of the department; total cost, ₱1,906.11.

Municipal Board and Disbursing Officer: Repairs to furniture; moving safe; made shelving for filing cases; made two large filing cases with pigeonholes; installed swinging screen doors to various offices; total cost, ₱618.90.

Court of Land Registration and Register of Deeds: Made two office signs; made and installed platform and railing for court; moved two office safes from old office to new city hall; installed shelving for Register of Deeds; made minor alterations in new offices; total cost, ₱156.08.

Botanical gardens: Repairs to house of superintendent; interior painting of lower part of house; repairs to roof and ceiling; repairs to swings and animal cages; total cost, ₱350.53.

Pluto wharf: Constructed platform for landing; rebuilt floor of wharf; total cost, ₱392.06.

Prosecuting Attorney's office: Made 4 sets book shelves; repairs to office safe; made 4 bookcases; repairs to office furniture; total cost, ₱86.15.

Matadero: Installed 1 sanitary water-closet; cut door through stone wall; repairs to floors; repairs to roof; installed settling basin for drain; total cost, ₱192.10.

City Attorney's office: General repairs to furniture; made 1 cabinet; installed bookcases; made shelving for filing cases; total cost, ₱58.35.

City pound: Repairs to doors, floors, and cells; cost, ₱52.09.

Launch *Buckey O'Neill*: Installed shelving for fire hose; cost, ₱28.27.

Palomar crematory: Painted railings on approach; repairs to windows, main building; completed the construction of approach; total cost, ₱1,988.29.

Paco crematory: General overhauling of crematory; repairs to dump; total cost, ₱1,857.76.

Midden sheds: Made 34 signs; removed and rebuilt midden shed near custom-house; total cost, ₱165.13.

Tenement house: Repairs to roof gutters and water-closets; cost, ₱12.03.

Steam barge *Pluto*: Repairs to base for compass and changing location of same; cost, ₱15.37.

Municipal court: Repairs to office furniture; cost, ₱5.78.

Total cost of repairs to markets and municipal buildings, ₱59,552.68.

BUILDING OPERATIONS DURING THE FISCAL YEAR 1904.

The following statements will show the number of permits issued and the value of private construction or repairs, by months, for the entire year. Structures built and repairs made by the military, Insular, or municipal governments are not included:

Number of permits issued, and the value of private construction and repairs during the year.

Month.	Strong materials.				Light materials.			
	New building.		Repairs.		New buildings.		Repairs.	
	Permits.	Value.	Permits.	Value.	Permits.	Value.	Permits.	Value.
1903.								
July	79	P213,502	61	P63,224	328	P44,236	95	P6,240
August	78	288,160	60	21,698	305	42,940	64	3,480
September	83	268,770	41	17,574	250	33,890	65	3,200
October	131	314,820	48	27,410	227	27,834	37	1,640
November	92	288,094	40	74,490	210	30,080	33	2,490
December	112	325,890	36	46,020	120	21,000	17	840
1904.								
January	133	290,220	54	31,544	175	31,134	36	2,590
February	61	306,860	44	11,516	183	32,280	28	1,984
March	73	274,470	66	57,439	250	38,606	32	2,688
April	78	320,034	55	10,330	277	57,560	65	9,826
May	50	151,190	61	22,844	295	55,008	85	9,766
June	74	338,843	73	18,687	212	41,184	66	6,120
Total	1,044	3,380,853	639	402,776	2,832	455,752	623	50,864

Number of applications filed, number of permits issued, and amount of fees received for the entire year.

Month.	Number applications.	Number of permits paid.	Amount.	
			Mexican currency.	Philippine currency.
1903.				
July	670	519	\$1,145.88	P600.02
August	580	505	818.15	714.50
September	566	457	244.36	1,138.18
October	472	442	234.66	944.62
November	424	375	300.20	926.66
December	362	285	583.76	273.40
1904.				
January	442	398	129.07	1,193.54
February	403	316	145.44	866.66
March	483	423	164.43	1,147.64
April	563	470	141.35	1,220.18
May	553	491	93.12	1,043.58
June	540	421	52.40	1,263.96
Total	6,058	5,102	4,252.82	11,606.34

The items shown in Mexican currency are actual amounts received in Spanish-Filipino and Mexican currency at the legal rates.

Value of construction and repairs made in the city of Manila, by districts, for the fiscal year 1904.

District.	Strong materials.				Light materials.			
	New.		Repairs.		New.		Repairs.	
	Permits.	Value.	Permits.	Value.	Permits.	Value.	Permits.	Value.
Binondo.....	133	P268,552	96	P41,720				
Ermita.....	113	423,691	71	43,616	1	P40	1	P30
Intramuros.....	42	49,830	110	90,890				
Malate.....	84	218,310	23	14,844	556	110,666	106	9,376
Paco.....	42	367,384	13	6,830	339	65,826	62	5,130
Pandacan.....	7	140,300			56	8,710	18	2,090
Sampaloc.....	118	290,050	47	15,950	428	78,688	113	8,600
Santa Ana.....	14	25,590	8	6,560	64	11,450	13	1,390
Santa Cruz.....	96	400,564	63	26,558	380	57,672	25	1,480
San Miguel.....	48	105,340	32	6,410				
San Nicolas.....	99	306,152	90	88,174				
Quiapo.....	119	306,210	64	44,184				
Tondo.....	126	478,880	25	17,040	1,008	122,700	285	22,768
Total.....	1,041	3,380,853	642	402,776	2,832	455,752	623	50,864

The number of buildings condemned and removed during the year was 548.

The general condition of private buildings throughout the city has greatly improved, and at no time since the American occupation have the condition and appearance been more thrifty. A comparison of the fiscal year 1904 with that of 1903 shows an increase of 623 permits issued. Thus it will be seen that during the past year a great improvement has been made.

This office earnestly recommends to the honorable Municipal Board the early passage of a new ordinance regulating building and plumbing inspection, as the experience the past year demonstrates the urgent necessity of same.

NEW BUILDINGS CONSTRUCTED BY THE CITY DURING THE FISCAL YEAR 1904.

New city hall.—In January, 1901, the Cosmopolitan Hospital Association let a contract in the sum of \$125,000, Mexican, for the construction of what is now the new city hall, and expended the amount of \$60,000, Mexican, when the work was abandoned for want of funds, and the uncompleted structure allowed to remain until the city finally purchased the same for the amount of P50,000, less cost of strengthening foundations and framework necessary of the then existing defective structure. The city then proceeded to complete the construction of the present building, which consists of a three-story frame structure covering a ground area of 16,500 square feet, having a frontage of 150 feet on Calle Bagumbayan and 110 feet on Calle Concepcion, and furnishing the best office quarters in the city for the entire municipal departments, except the City Assessor and Collector and the Municipal Court, both of which could be accommodated in the same building were it not for the fact that more than half

of the upper floor is occupied by the Court of Land Registration and the Register of Deeds.

The total cost of the structure as it now stands amounts to ₱143,443.74, all of which was done by contract.

Machinery building, city shops.—This building consists of a one-story frame structure, being in size 50 by 120 feet, and was built by contract at a total cost of ₱10,534.

Veterinary hospital.—This is an up-to-date veterinary hospital, complete in every particular, and consists of a one-story frame building, covering a ground area of 35 by 140 feet; was built by contract, costing ₱10,829.83.

Tanduay fire station.—This is Manila's best fire station, being the most modern in design and arrangement for the purposes intended, and is a very beautiful structure, standing at the junction of Calles Concordia and Romero Arquino, District of Quiapo. The building is constructed of brick and frame, is two stories high, and covers a ground area of 61 by 78 feet. It was built by contract at a total cost of ₱54,761.30.

Road-roller shed, city shops.—This is a one-story frame building, built by contract, costing ₱1,878.

Tondo police station.—This structure is now under construction, and when completed, which will be about August 15, will give to Manila the best police quarters in the city. The building itself is of beautiful design and a substantial structure of two stories. It is built of brick with cement and tile finish, and fully equipped with modern police conveniences, such as cells and sanitary arrangements. It covers a ground area of 47 by 66 feet, situate on Calle Solis, District of Tondo. It is being built by contract, and when completed will cost ₱26,670.

Binondo band stand.—This structure is located in the center of Plaza Calderon de la Barca, District of Binondo, and is the largest band stand in the city; built by city workmen at a cost of ₱2,403.66.

Tondo fire station.—This is a two-story frame building constructed as a temporary quarters for one company in the nipa district of Tondo; built by contract at a cost of ₱3,745.

The following statement shows the cost of buildings constructed during the fiscal year 1904:

New city hall	₱143, 443. 74
Machinery building, city shops	10, 534. 00
Veterinary hospital, Palomar	10, 829. 83
Tanduay fire station	54, 761. 30
Road-roller shed, city shops	1, 878. 00
Tondo police station, prior to June 30 ¹	9, 450. 00
Binondo band stand	2, 403. 66
Tondo fire station	3, 745. 00
Total construction for the year	237, 045. 53

¹ This building will be completed in August; total cost, ₱26,670.

PUBLIC LIGHTING DURING THE FISCAL YEAR 1904.

The following increases have been made:

Two 2,000-candlepower arc lights, Tondo corral; thirteen 2,000-candlepower arc lights, Santa Mesa to San Juan Bridge; two 2,000-candlepower arc lights, Calle Isaac Peral; six 2,000-candlepower arc lights, Calle Herran; three 2,000-candlepower arc lights, Calle Santa Monica; one 2,000-candlepower arc light, *Pluto* dock; ten 2,000-candlepower arc lights, Calle Cervantes; four 20-candlepower incandescent lamps, Calle Reten, Sampaloc; five 20-candlepower incandescent lamps, Calle San Anton, Sampaloc; three 20-candlepower incandescent lamps, Calle Palmara, Sampaloc; eleven 20-candlepower incandescent lamps, Calle Solucan, Sampaloc; three 20-candlepower incandescent lamps, Calle Castanos, Sampaloc, fifteen 20-candlepower incandescent lamps, Calle Balic-Balic, Sampaloc; six 20-candlepower incandescent lamps, Calle Guipit, Sampaloc; eight 20-candlepower incandescent lamps, Calle Lavendera, Sampaloc; five 20-candlepower incandescent lamps, Calle Lardizabal, Sampaloc; twenty-nine incandescent outlets, City Assessor and Collector's Office; four incandescent outlets, steam barge *Pluto*; thirty-three incandescent outlets, Tondo stables; eighty incandescent outlets, municipal building, Calle Victoria; one hundred and ninety-nine incandescent outlets, new city hall; twenty-five incandescent outlets, Binondo bandstand; one hundred and five incandescent outlets, Tanduaay fire station.

The ten lights referred to on Calle Cervantes, Trozo, have been reinstalled since the Trozo fire.

The municipality had lights in operation at the close of the fiscal year 1904 as per the following statement:

Arc lights:

2,000 candlepower (streets)	262
2,000 candlepower (harbor)	15
2,000 candlepower (parks and grounds)	2
2,000 candlepower (matadero)	3
1,500 candlepower (markets and public buildings)	17
Total	<u>299</u>

Incandescent lamps:

20 candlepower (streets)	1,062
20 candlepower (Divisoria market)	100
16 candlepower (municipal buildings)	967
10 candlepower (municipal buildings)	6
Total	<u>2,135</u>

Fan connections (municipal buildings), 25; motor connections (fire and police), 6; total cost of electrical service for the year was ₱98,613.30.

The necessary minor repairs for keeping up the service of the municipal buildings have been satisfactorily carried on.

The relations now existing between the City Electrician and this office have been most pleasant, and satisfactory results have been obtained.

All incandescent lights in public buildings throughout the city have been put on meter system, and it is found to be very satisfactory.

The lines along Calle Real, Intramuros, and Calle Anloague, Novalliches, Jolo, and Escolta have been rebuilt by the La Electricista, greatly improving the service.

Telephones.—During the year the following operations have been carried on in connection with the telephone service of the city:

Installed telephone central in new city hall, established thereby service throughout the building besides direct connection with all fire and police stations, also El Deposito and pumping stations; three separate and direct lines are connected with the Spanish central and one with the military central, thus giving the city and the public dealing with the municipality a good service. A new 100-drop switchboard has been ordered, and when installed will give the municipality an up-to-date exchange.

The following list of new telephones has been installed during the year: Judge of the Municipal Court; central station, pail system; Assistant Prosecuting Attorney, residence; matadero.

The following telephones have been changed in location during the year: President of the Municipal Board, residence; Chief of Police, residence; Court of First Instance; Malate police station; judge of the Municipal Court; Tondo police station; Mr. McDonnell, member of the Municipal Board.

The following telephones have been discontinued during the year: San Nicolas fire station; Paco fire station; Audiencia fire station; Tanduary fire station; Santa Cruz native police station.

The discontinuance of fire-station apparatus as above stated was caused by the establishment of direct service on city lines.

The new line connecting the city hall with El Deposito and pumping station has been rebuilt with metallic circuit by the city, giving a very satisfactory service.

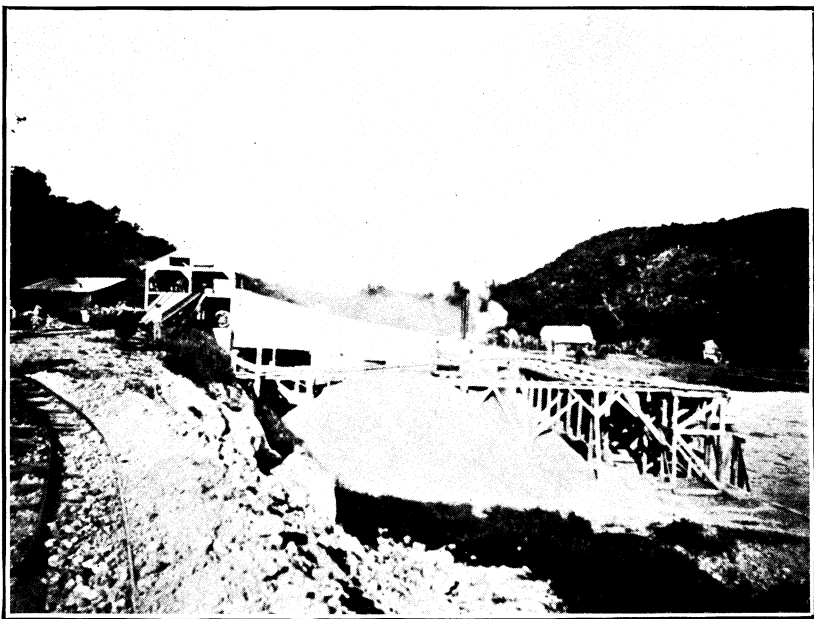
The total cost of telephone service for the year was ₱2,626.80.

PLUMBING INSPECTION.

Prior to January 1, 1904, there was no office of "plumbing inspection." All plumbing work prior to that time consisting of the inspection of old and new buildings, the issuance of sanitary orders for proposed plumbing work, inspection and supervision during the progress of the work, and the issuance of certificates after the work had been completed was under



BUILDING CEMENT CURB IN PLACE. (FILIPINO LABOR.)



CITY STONE-CRUSHING PLANT, TALIM ISLAND.

the immediate supervision of the Board of Health for the Philippine Islands.

During the past three years the installation of modern plumbing work has become so extensive that many so-called plumbers have sprung into existence, many of whom do not know the first principles or rudiments of sanitary plumbing. This being the case, an injustice was naturally wrought upon property owners, who were inclined to get what they considered a good piece of modern plumbing work at the lowest possible figures. The owners in many cases were compelled to have the plumbing work thus performed removed or remodeled, at additional expense, at a not very distant date. Injustices of this character were being practiced on the property owners, who were at a loss to understand what course to pursue. The Board of Health was consulted for necessary relief or information, and the property owners have gradually come to realize that, in order to have the work satisfactorily installed, the contractors must be required to produce a certificate from the Board of Health showing that the work has been performed satisfactorily before any payment is made by the owner for the work.

Now, while there are many systems of sanitary appliances adopted for use in buildings in the city of Manila by the Board of Health, the use of any one kind is not compulsory, but the matter of choice is left to the owner. The Board of Health has, however, insisted that, whatever the kind of sanitary appliances installed in a building or on the premises, they must be of proper quality and installed in a satisfactory sanitary manner.

Owing to the amount and class of work being performed by many contractors, the duties of the Sanitary Engineer for the city of Manila became so great that it became necessary for the Commissioner of Public Health to appoint an acting plumbing inspector, under the Sanitary Engineer, to assist in carrying out the work. A committee has been appointed to formulate a plumbing ordinance for the city, and the work is now in progress. The ordinance as finally adopted by the Municipal Board will serve as a standard by which plumbing contractors will be guided, and which will undoubtedly greatly improve conditions. When the ordinance has been passed by the Municipal Board it will become a part of the sanitary code now being compiled by the Board of Health.

The rules of sanitation laid down by the Board of Health and under which they have been working for some time past will be incorporated in the proposed plumbing ordinance, which will, when enacted, become a protection to property owners against the use of improper materials and poor workmanship.

Under the rules adopted by the Board of Health prior to the time the office of plumbing inspection was created, certificates of work performed were issued by the Sanitary Engineer, after a most rigid inspection of all work had been made. In many cases the work has been so defective that it was necessary for the inspector to make as many as six or eight visits before the work could be accepted. In one case recently, six distinct visits were made to the same piece of plumbing work before it could be accepted as sanitary and a certificate issued; in another piece of work in a three-story building where eleven flush water-closets were being installed, it was discovered that seven out of the eleven bowls were improperly connected to cast-iron soil pipe, and instead of being connected by means of 4-inch ferrules and lead sockets, as required by sanitary rules, they were simply placed sitting up on the floor embedded in common, ordinary lime mortar with no nails, screws, or any kind of fastenings, and the distance from the bowl socket to the cast-iron soil pipe was about 6 inches; also a 2-inch galvanized wrought-iron vent pipe was bent and kinked in such a manner as to make an opening of about 1 inch instead of 2 inches, as required. This work necessarily had to be gone over and many changes made, after which the peppermint test was applied, revealing several leaks in the badly caulked joints, and before the work was satisfactory eight additional inspections had to be made. Yet, at the first, when the work was in its faulty condition, the plumbing contractor had made application for certificate, stating that the work had been completed.

The foregoing are only two cases of many that may be cited in the city of Manila. However, these conditions are being overcome constantly, and during the past six months the plumbing work performed has steadily advanced in quality, as also in quantity, and where formerly there were five licensed plumbers there are now fourteen in the city of Manila. While many of these can not be considered as first-class plumbers, they have been able, under existing ordinance, to obtain the necessary permit or license to do the work. It is hoped that the proposed ordinance will regulate this matter in such a way that property owners may be protected.

As an example the following will explain existing conditions:

From March 14 to July 1, 1904, 139 plans for plumbing in new buildings were presented and examined by this office, and out of that number only 47 were found to be correct and were approved and the work allowed to proceed, while 92 were found to be incorrect, were disapproved, and the necessary changes made before they could be accepted. Most of these cases were found defective from a sanitary standpoint covering drainage and plumbing.

The following list will show the new and old buildings in which plumb-

ing has been installed or overhauled since January 1, 1904, and is shown by months and districts:

Districts.	Jan- uary.	Febru- ary.	March.	April.	May.	June.
San Miguel.....	2	2	2		4	
San Nicolas.....	9	6	13	12	2	6
Santa Cruz.....	9	7	8	4	6	5
Sampaloc.....	3	6	8	4	4	7
Intramuros.....	4	5	2	3	1	5
Binondo.....	5	4	8	8	3	7
Ermita.....	6	8	5	6	3	5
Malate.....	2	3	1	6	6	5
Quiapo.....	4	8	9	7	3	7
Tondo.....	10	3	4	3	1	7
Paco.....	2	6	1		4	4
Total.....	56	58	61	53	37	58

Recapitulation.

Salaries, total.....	P31,569.16
Labor, cleaning and caring for public buildings.....	34,680.70
Supplies, cleaning and caring for public buildings.....	5,178.14
Rentals.....	62,293.91
Repairs, markets and municipal buildings.....	59,552.68
Electrical service.....	98,613.30
Increase in repairs to electrical service.....	4,345.76
Telephone service.....	2,626.80
Construction.....	237,045.53
Total.....	535,905.98

Respectfully submitted.

L. A. DORRINGTON,

Superintendent of Buildings and Plumbing Inspection.

The ACTING CITY ENGINEER,

Manila, P. I.

REPORT OF OFFICE OF DRAFTING AND SURVEYS.

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS,

Manila, P. I., September 26, 1904.

SIR: I have the honor to submit the following report of the work performed by this Office during the fiscal year of 1904:

While a great deal of work had evidently been done by this office in the years since American occupation, it was found on taking charge of the office in September of 1903 that few records of such work were to be found, and that such as were on file were of such an indefinite nature as to be of little value.

The existing streets are very narrow and crooked, and in order to beautify the city and make the streets capable of handling the traffic

required it is absolutely necessary that some systematic scheme of development be worked out and followed. In the previous work of the office nothing of this sort had been done, or, if it was done, none of the plans were ever approved by the Municipal Board and a record made. The large amount of building under way made it imperative that street lines be determined upon and definitely fixed in order that the new structures should conform to the general scheme of street development. A large part of the work of the office has been the making of surveys and maps of the streets throughout the city, and practically all of the more important streets have been resurveyed and maps made upon mounted paper showing the street lines as approved and fixed by the Municipal Board. Each plan is countersigned by the City Engineer and the Secretary of the Municipal Board and forms a permanent record. The policy regarding street widening has been to compel all new structures to conform to the approved lines, and in cases where this makes necessary the expropriation of private property the city pays for the strip taken at the assessed valuation. This method seems at the first glance to be a slow one, and it will, of course, take years to remodel the city, but building has been active, and the results of this method, inaugurated last September, are now apparent in many parts of the city.

Attention is invited to the attached plan of the city of Manila, upon which are shown the street lines actually surveyed and approved during the year, and also the studies for street extensions, etc., made during the year.

During the coming year the work of placing permanent monuments at street intersections will be begun and carried forward. Plan of standard street monument is appended.

Plans and specifications are also prepared in this office for all the engineering work carried on by the city, and several standards have been inaugurated.

Plans for the new bridge over the Binondo Canal were prepared and the contract for the work has been let. This bridge, on account of its location and the traffic to be accommodated, presented many difficulties of design, but it is believed the scheme adopted meets the conditions satisfactorily. Plans are appended.

Plans for the new Ayala Bridge over the Pasig River have also been prepared and the work advertised. This design presented difficulties on account of the impossibility of raising the approaches or of reducing the clear head room. Plans are appended.

In preparing plans and specifications for work it has been the policy to standardize the work as much as possible, and a set of "general conditions" has been prepared for use in all contracts.

The following statement is a summary of the work performed during the period from October 1, 1903, to June 30, 1904. There is no record

for the months of July, August, and September of 1903, the present systems not having been started until October 1 of that year:

Month.	Balance jobs uncompleted on 1st of month.	Jobs re-ceived during the month.	Total jobs on hand.	Work completed.					Number of jobs on hand uncompleted.
				Survey, street lines, building lines, etc.	Profiles, grades, etc.	Miscel-laneous, land survey, maps, estimates, etc.	Can-celed.	Total jobs com-pleted.	
1903.									
October -----		76	76	29	8	20	-----	67	9
November -----	9	78	87	18	5	47	-----	70	17
December -----	17	76	93	30	6	21	-----	57	36
1904.									
January -----	36	45	81	24	4	13	3	44	37
February -----	37	69	106	40		19	-----	59	47
March -----	47	88	135	37	5	36	-----	78	57
April -----	57	87	144	55	5	44	-----	104	40
May -----	40	68	108	29	12	23	2	66	42
June -----	42	85	127	38	8	30	3	79	48

Total jobs received, 672; less 624 completed, leaving 48 jobs pending.

Force employed and the wages paid.

ADMINISTRATIVE FORCE.

Position.	Number.	Salary.	Remarks.
First Assistant City Engineer	1	\$5,000.00	American.
Second Assistant City Engineer	1	3,600.00	Do.
Second Assistant City Engineer	1	3,200.00	Do.
Assistant City Engineer	1	3,200.00	Do.

¹ Vacant six months.

DRAFTING AND SURVEYS.

Assistant engineer	1	\$3,200.00	American.
Do	1	2,800.00	Do.
Draftsmen:			
Engineering	1	2,800.00	Do.
Architectural	1	3,200.00	Do.
Transitman	1	2,400.00	Native.
Draftsmen	2	1,840.00	Do.
Do	2	1,600.00	Do.
Chainmen	6	1,600.00	Do.
Laborers		6,597.47	Do.

¹ Each.

Each field party is made up of one assistant engineer in charge of party, one chainman, and three laborers. The native "chainman" is generally skillful enough to set up the transit, and he can, in most cases, read angles. It is necessary, however, to check his work very carefully. The native draftsmen make excellent traces, but can in very few cases plat surveys or design work. It has, therefore, been necessary for each chief of party to plat his own notes and work up the plans complete in all respects before having them traced.

Cost of field party for one day.

Item.	Maximum.	Minimum.
1 assistant engineer.....	P12.00	P8.00
1 chainman.....	2.00	2.00
3 laborers.....	4.50	4.50
1 carromata ¹	3.25	3.25
1 carretela ²	1.69	1.69
Total.....	23.44	19.44

¹Hired.²Furnished by city.

The equipment of this office is in good condition, and it is believed that more and better work is being accomplished by the force employed than formerly.

Respectfully submitted.

S. B. PATTERSON,
First Assistant City Engineer.

The CITY ENGINEER, *Manila, P. I.*

REPORT OF THE SUPERINTENDENT OF CITY SHOPS.

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS,
Manila, P. I., June 30, 1904.

SIR: I have the honor to submit the following report of the operations of the city shops for the fiscal year 1904:

EQUIPMENT, TOOLS, AND MACHINERY.

The buildings are all in good condition and repair.

The following buildings have been erected during the year: Main shop, 50 by 120 feet, cost, P10,270; shelter building for road rollers, P1,878; shed for repairing and storing pail-system equipment, P422.

The wheelwright shop has been rearranged and divided into three parts—one part for use as a paint shop, also as a dustproof chamber for varnishing vehicles, and a proper floor of cement for washing installed; the center portion fitted with three doors for storage purposes; the remaining part equipped with “stocks” for shoeing of animals.

During the year there were received from the United States and installed in main shop one 20-horsepower Atlas engine and 25-horsepower Atlas boiler, wood and metal lathes, shaping machine, band saw, circular saw, power drill, emery grinder, planing machine, power grindstone, hub-boring machine, spoke-tenoning machine, tire shrinker, bolt cutter, and shearing machine. Four brick forges were built in main shop and connected to a Buffalo fan, replacing hand bellows. All mechanics in main shop were furnished complete sets of modern tools.

WORK PERFORMED.

Main shop.—During the year 1,048 orders were completed, over half this number being completed after the installation of machinery in the last four months of the year.

Distribution of orders received.

Repairs to means of transportation	723
Department of Police	20
Fire Department	31
Crematories	38
Engineering and survey parties	24
Office of the City Engineer	5
Municipal buildings	7
Parks	4
Street construction and bridges	68
City stables, miscellaneous work	28
Launches	9
Scows and bancas	5
Miscellaneous work at shops	48
Law Department	5
Road rollers	8
Water supply	1
Pail system	13
Dredger	3
Steam barge <i>Pluto</i>	2
Civil Hospital	2
Fourth of July work	4
Total	1,048

The following work of special mention was completed in main shop: Constructed 26 carts, Class A, for garbage collection; constructed 1 wagon for removal of dead animals; constructed 6 carretelas; rebuilt 3 sprinkling wagons, replacing wooden tank with one of iron; renumbered and classified all means of transportation; constructed steam chest and forms for bending shafts, etc.; made 150 meat hooks for matadero; constructed 1 wooden tank, 1,000 gallons capacity; sawed 10,815 wooden paving blocks; built shoeing stocks for farrier shop.

Saddler shop.—During the year there were completed 453 orders, which were distributed as follows:

Department of Engineering and Public Works	369
Police Department	32
Fire Department	30
Steam barge <i>Pluto</i>	2
Miscellaneous work, city shops	5
Parks	2
Water supply and sewers	3
Office of the City Engineer	4
Law Department	4
Veterinary Hospital	2
Total	453

Miscellaneous work.—There were constructed and launched 12 scows for hauling rock, making a fleet of 21 now in service; constructed cement sidewalk, laid curbing and sodded borders in front of shop inclosure; molded 1,554 cement curbings, each 1 meter long; brick coal bin built for main shop; 200 commodes constructed for pail system; new awning and curtains made for the launch *Washington*.

RECOMMENDATIONS.

The shop inclosure now having been raised to street level, it is recommended that a system of drainage be designed and installed by the superintendent of water supply and sewers to supplement the few drains put in as an emergency measure, this plan to also drain the street immediately in front of the shop inclosure.

A large building with a raised floor is urgently needed for the storage of forage and cement.

The erection and operation of a small foundry would result in a great saving to the city.

A wagon scale would be of great advantage in determining weights of coal received.

Respectfully submitted.

GEO. P. NIEMAN,

Property Clerk and Superintendent of Repair Shops.

The ACTING CITY ENGINEER,

Manila, P. I.

REPORT OF SEALER OF WEIGHTS AND MEASURES.

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS,

Manila, P. I., June 30, 1904.

SIR: I have the honor to submit the following report of the weights and measures sealed, rejected, and destroyed and fees paid during the fiscal year ended June 30, 1904. This office has since said date been transferred to the Department of Assessments and Collections.

Weights and measures sealed.

Name.	Character.	Number.	Total.
Cavanes	Dry	131	P39.30
One-half cavanes	do	176	52.80
Arrobas	Liquid	99	29.70
One-half arrobas	do	86	25.80
One-fourth arrobas	do	64	19.20
Five litros	do	2	.60
Ten litros	do	2	.60
Twenty litros	do	5	1.50
Gallon	do	2	.60
One-half gallon	do	6	1.80
One-fourth gallon	do	3	.90

Weights and measures sealed—Continued.

Name.	Character.	Number.	Total.
Gantas	Dry and liquid	2,789	P836.70
One-half gantas	do	2,581	774.30
Chupas	do	3,958	791.60
One-half chupas	do	5,347	1,069.40
One-fourth chupas	do	5,310	1,062.00
Varas	Linear	1,645	329.00
Yardas	do	108	21.60
Metros	do	26	7.80
Brazas	do	8	2.40
Romanas	Weight	1,955	1,173.00
Basculas	do	188	188.00
Balanzas	do	346	242.20
Seven libras	do	1	.10

Collections.

Month.	Amopnt.	Month.	Amount.
1903.		1904.	
July	P130.80	January	P838.40
August	179.70	February	1,252.40
September	91.70	March	1,958.40
October	89.60	April	1,354.20
November	88.70	May	474.40
December	32.40	June	185.20
		Total	6,670.90

Measures rejected and destroyed.

Dry and liquid	493
Linear	99
Total	592

Respectfully submitted.

V. SAN MARTIN,
Sealer Weights and Measures.

The ACTING CITY ENGINEER,
Manila, P. I.

REPORT OF MR. DESMOND FITZGERALD UPON THE PROPOSED NEW WATER SUPPLY.

MANILA, P. I., *April 28, 1904.*

DEAR SIR: I have the honor to present herewith my report as Consulting Engineer upon the proposed new water supply of the city of Manila:

PRESENT WATER SUPPLY.

In 1743 Francisco Carriedo y Peredo bequeathed \$10,000 for the construction of a water supply for the city of Manila. The investments of this sum were so well managed that notwithstanding several vicissitudes and losses it amounted in 1867 to \$355,706.88. The services of Don Genaro Palacio as chief engineer were at that time secured, resulting in the completion of the present works in 1882.

The urgent necessity now existing for the building of a new system will be much better realized by an understanding of the limitations of the present supply and the great dangers which have developed in the use of water from the present source.

At Santolan, on the Mariquina River, water is pumped directly from the river through two 24-inch cast-iron pipes 0.233 miles in length to an aqueduct which has a length of 3.22 miles and terminates in the Deposito, or distributing reservoir, three-fourths of a mile outside the city limits. The aqueduct is built partly in tunnel and partly in cut and cover and has a capacity of about 8,000,000 gallons per twenty-four hours. The flow line of the water in the Deposito is but 78 feet above mean tide. The Deposito, which holds 16,000,000 gallons, is an admirable structure for an earthquake country. It consists of parallel arched chambers, tunneled out of the soft dhobie rock and connected by two cross tunnels, forming groined arches at the intersections. The roof is at least 8 feet in thickness. From the Deposito the water is conveyed to the city through a 26-inch cast-iron pipe.

It will be clearly seen from the foregoing description that whatever the quality of the water may be in the river at Santolan it can not change materially in its short passage to the consumer in the city. A more dangerous condition can hardly be conceived. Directly above Santolan and between that point and Montalban are about 25,000 people whose only drain is the river. The report of Dr. W. E. Musgrave in the appendix sets forth so fully the possibilities of contamination arising

from this condition that I will not dwell longer on this subject, but it is a source of little wonder that people in Manila who have knowledge of the most elementary principles of sanitary science avoid drinking the water.

Aside from sanitary considerations, the capacity of the present source of supply has been nearly reached, and in considering an adequate system for the present and future supply of Manila it is necessary either to enlarge the present works or to find a new source.

In 1903 Maj. James F. Case, City Engineer of Manila, was employed to make an examination and recommendations in regard to a new water system, and his report was submitted to the Municipal Board and printed in its annual report for the fiscal year 1903. It is this report upon which, as Consulting Engineer, I have been asked to form an opinion.

Major Case offered the following recommendations as a result of his studies and the reasons for his conclusions are fully given in his report:

- (1) A gravity supply to be taken from the Mariquina River above Montalban.
- (2) The creation of a forest reserve of the watershed above the point of diversion.
- (3) The construction of a dam and storage reservoir at the gorge.
- (4) A steel pipe line to the Deposito.
- (5) The enlargement of the Deposito to a capacity of 70,000,000 gallons and the raising of its water surface.
- (6) The laying of a new distribution system.

There were some other recommendations embodied in his report, but the above covers the principal features.

FUTURE REQUIREMENTS.

Major Case has estimated that the daily supply of water to be furnished Manila shall in the course of twenty years amount to 20,500,000 gallons, and has planned the principal features of his proposed works upon that basis. I believe that it would be unwise to design the works upon any smaller amount of water, and when a larger system of distribution pipes is carried out, the quality of the water improved, and the pressure raised it would not be at all suprising to see that consumption reached before the expiration of twenty years.

Although this estimate would be a small one for cities in the United States, the peculiar conditions existing in Manila, taken in connection with the universal adoption of meters for the measurement of the water distributed, lead me to believe that the estimate is a reasonable one.

SOURCE OF SUPPLY.

I heartily concur in the selection of the gorge above Montalbon for the construction of the dam to impound the water of the Mariquina River. The fact of it is, under the circumstances there is hardly a ques-

tion of choice of sources of supply. Even if the present plan of pumping were retained, a storage reservoir would be necessary to equalize the flow of the river and provide sufficient water in times of drought to meet the growing demands of the city. If storage must be provided, in any event, it should be designed at such an elevation that water will run into the distribution system by gravitation, thus dispensing with the great expense of pumping. The lower site on the Mariquina River, referred to by Major Case, is not at a sufficient elevation to furnish water economically at the distributing reservoir, especially if the grades be somewhat raised, as seem to me advisable.

The gorge above Montalbon is therefore the only good source available, and it is a matter of congratulation that this peculiar topographical condition exists within such a short distance of so large a city and that it can be so easily developed.

WATERSHED AND FOREST RESERVE.

No accurate survey exists of the watershed of the Mariquina River. From such facts as have been furnished me as a result of reconnoissances and from the personal testimony of those who have followed the river, aided by certain photographs, I am satisfied that Major Case's estimate of 60 square miles as the area of the watershed is a conservative one, and I believe that whenever the divide is surveyed it will be found to be larger.

The proposal to create a forest reserve of the whole watershed and to remove the village of Boso-Boso, and by this means secure the river against the possibility of sewage contamination, must commend itself to everyone.

RAINFALL AND STORAGE.

From the very excellent meteorological records of the Manila Observatory it appears that the average rainfall for the past thirty-nine years (1865-1903) is 75.4 inches. As the proposed supply only amounts to a collection of about 7.2 inches from the 60 square miles of watershed, in the course of a year there can be no doubt that the average rainfall will supply a much larger amount of water. It is, however, to the periods of droughts that we must turn for instruction. A close inspection of the rainfall table appended to this report shows that there is always a rainy season in every year, although the amount is subject to great variations; in other words, however prolonged the droughts may be, they never extend over from one year to another, so that in the case under consideration there is no necessity for providing storage for a longer period than that found in the most prolonged drought occurring in the dry season of a single year.

On the average the dry period covers five months from December to April, both inclusive, and a perfectly defined wet season covers the other

seven months, May to November, inclusive. When examined by years, however, it is clear that there has never been an extremely dry month or a month with absence of rain during June, July, August, September, October, and November, six months, and that, of the two months at each extremity of this wet season, the month of December is the one which may more often prove deficient, leading to the classification of this month with a prolonged drought. The month of May is a very uncertain month and may be either entirely dry or wet, according to the season.

The two most serious droughts which have occurred in thirty-nine years are those of 1885 and 1903, and these covered the months of January to May, both inclusive. Another drought in 1867-8 covered the period from December to April. All of these droughts were of five months' duration, and there was either an entire absence of rain or so little as to be negligible for water-supply purposes.

As shown in Major Case's report, the Mariquina River was gauged at the end of both of the droughts of 1885 and 1903, and gave practically the same result for the minimum flow of the stream, viz, about 11,000,000 gallons daily.

It seems highly probable, however, from the foregoing that there may be some minimum drought in the future which may include the month of May and thus extend over a period of six months without rain. On this assumed basis I have computed a possible deficiency including evaporation losses of about 2,000,000,000 gallons, to be provided by available storage in the reservoir on the basis of a daily draft of 20,500,000 gallons.

The larger part of the storage for this assumed drought is provided for in the proposed storage reservoir, and as it is undesirable to enlarge the reservoir by raising the dam, on account of earthquakes, it can be provided for simply and easily by small dams farther back in the mountains whenever experience shows it to be desirable to increase the storage. It is not probable, however, that it will be found necessary for many years.

QUALITY OF THE WATER.

The quality of the water to be delivered at Manila is, I believe, of paramount importance. It seems hardly necessary in this generation to use any arguments to give weight to the urgent responsibility resting upon everyone connected with the solution of the question to give to it the most careful and sober consideration. It should never for a moment be lost sight of that the water may be made to convey to every consumer influences either for life and health or for disease and death. From the low standard of the commercial aspect alone, the furnishing of a water supply which is above suspicion is the very best investment that a city can make. It invites trade and commerce and does its share toward the permanent prosperity of the city. In con-

nection with good sewers to remove filth from the city it does more to reduce dangers and expenses incident to epidemics than almost any other agency over which man exerts control. Manila is now served with raw water from the Mariquina River, which is the best conveyer that man could design to carry the germs of disease to everyone who is unfortunate enough to be obliged to drink it. So well is this understood by the physicians and biologists in the city that the most watchful guard is kept constantly against the dangers that lurk in the water supply, and boiling, distillation, and bottled waters are resorted to. It has been shown by Dr. Musgrave that the dreaded ameba, the most persistent and dangerous of all the disease germs of the Tropics, may be found in every sample of water drawn from the taps in the city. While it may be difficult to prove that the germs of cholera or other tropical diseases are conveyed to Manila in the water in times of epidemics, there is a well-grounded suspicion from the environmental conditions just above the point of intake at Santolan that such may be the fact.

I come now to the more technical consideration of the investigation into the present condition of the water and the probable freedom from contamination of the future supply if the plans proposed are carried out.

Dr. Paul C. Freer, Superintendent of the Government Laboratories, has furnished Major Case with the results of the chemical and biological examinations which have been made under his able direction. These are published as an appendix to this report.

As far as the chemical results are concerned the Mariquina water is of excellent quality. An examination of the amount of nitrogen in its several conditions shows that the amount of organic matter present is not above the normal of good water supplies. There is an absence of nitrites and the chlorine is low. The bacteria are not abnormally high for river water, and the water is comparatively soft, so that it will not require a large amount of soap in the laundry. The water is free from color, showing an absence of swamps upon the watershed.

The reports in regard to the sanitary conditions between Montalbon and Santolan explain themselves so fully as to require no comment, but the finding of amebæ in the natural waters of the river above the gorge has added weight to my conviction that in any event the water drawn from the storage reservoir should be filtered before being distributed to the consumer. Wherever water is impounded in a reservoir it is subject to many growths which impair its quality for a domestic supply. Even where reservoirs are constructed in the most ideal way by removal of all organic matter from the site of the reservoir and the deepening or filling of all the shallow margins, called technically "shallow-flowage improvement," there are times when large growths of algæ and other organisms infest the water in a reservoir of ordinary size and render it disagreeable.

The Mariquina River in times of heavy rainfall will bring considerable amounts of sediment and more or less matter of an organic or nitrogenous nature into the reservoir which, in connection with the high temperature of the water, will render it at times unfit to use. For these reasons I am clearly of the opinion that the water should be filtered at some convenient spot on its way to the city. Favorable sites occur at the correct elevation. The water can then, after purification, pass to the distributing reservoir, which should be covered to protect the filtered water from the air and sun.

The necessity for filtration becomes still more imperative when we consider the presence of amebæ in the water in its natural condition. The problem as to whether this protozoa can be removed by filtration is, so far as I am aware, a new one. We know that in well-regulated and properly conducted systems of filtration a very high percentage of the bacteria is removed and the use of infected waters rendered comparatively safe. The experience of the world for many years has taught this valuable lesson. We know too that amebæ live upon the bacteria and are much larger in size, but text-books are silent upon the subject of filtration in connection with amebæ. The inference would naturally be that if filtration will remove the typhoid and cholera bacilla it will also remove the amebæ, but this does not follow. To throw some practical light upon this important question, Major Case has at my request undertaken a series of experiments for the purpose of ascertaining whether amebæ can be removed by filtration through open sand filters after the English pattern. There are some reasons for supposing that amebæ will pass through any sand filter, however fine the particles or however thick the layer. The experiments are still in progress. The chemical and biological work is carried on under the direction of the laboratories.

PHYSICAL ASPECTS OF THE PROPOSED WORKS.

DAM.

I approve of Major Case's plan for the building of the dam in the gorge above Montalbon. The dam in plan is to be curved and the section a gravity one. Although it would be highly desirable to raise the proposed dam to a greater height than 60 feet—and in any other country than one in which earthquakes are of frequent occurrence I should recommend this to be done, both for the purpose of securing more head and more storage—I consider that a judicious mean has been selected. More storage can at any time be secured by building low dams farther back in the mountains, and at small expense, and more head can be secured by enlarging the section or reducing the friction in the conduit line. In considering the security of the dam, all that man can do will have been done if it is built so securely that

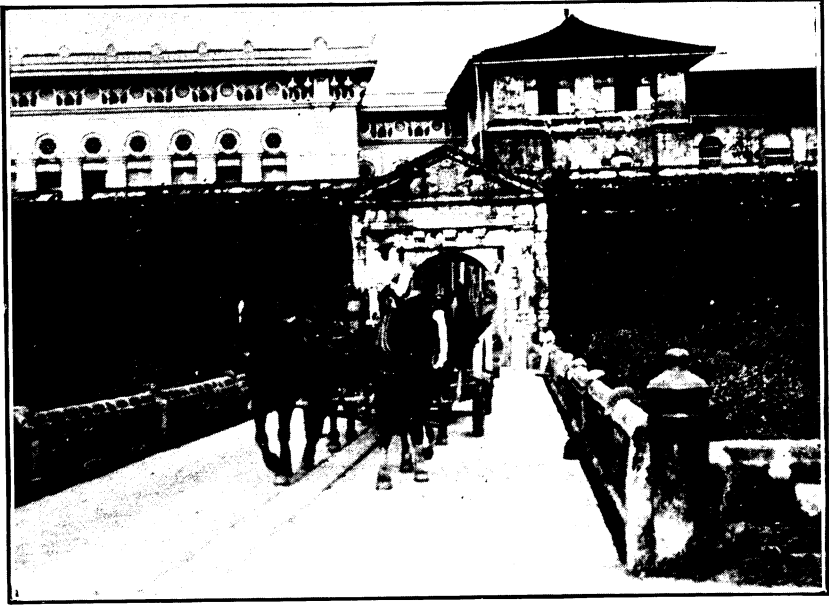
none of the forces with which we are familiar will disturb its position. The dam should be so constructed that the largest freshets and of any depth will sweep over its entire crest and fall upon a mass of enormous boulders at its base. I can imagine that an earthquake might crack such a structure or even injure it severely, but it is difficult to conceive that the dam, built into the solid rock as proposed, and itself composed of masonry, could be so wrecked as to allow the impounded water to escape in one large mass. Should this occur the presence of the large lake in connection with the Pasig River would materially reduce the dangers of such a flood to the city of Manila.

STEEL PIPE LINE.

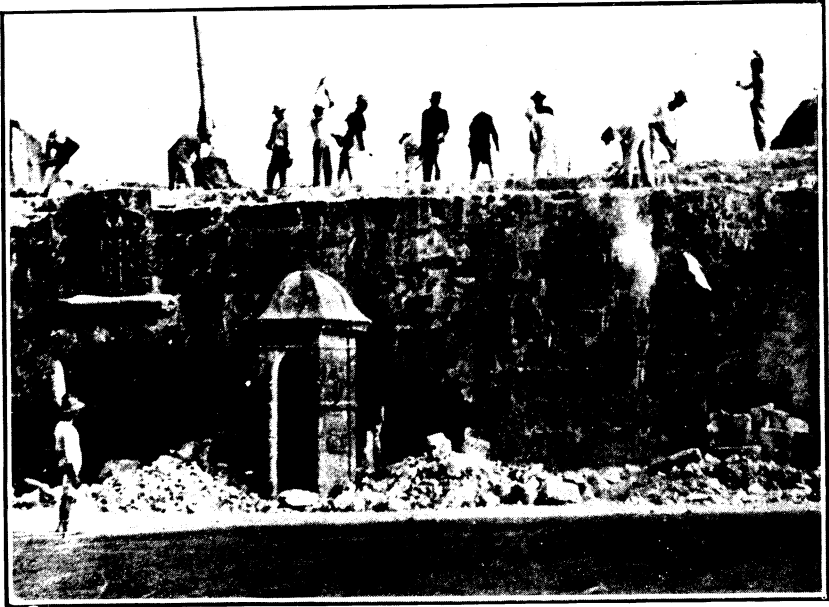
The proper construction of the steel pipe line is one of the most difficult problems connected with the new works. If it is well built it will have a comparatively long life—say, fifty years—and if there is a single flaw in any of the many slow and tedious processes leading to its final acceptance that flaw will be sure to be the cause of annoyance and trouble. Steel pipe lines are of comparatively modern invention, and improvements are constantly made in their construction. It is claimed on the Pacific coast by some experts who have had much experience in the use of wrought iron instead of steel for mains that the wrought iron is very much the superior of steel for this purpose, and the largest pipe now under construction for San Francisco's supply is of this material. It is claimed that the life of a wrought-iron pipe is much greater than one of steel, and where certain conditions are fulfilled in the piling of the bars in the furnace so as to produce an iron in laminated layers I am inclined to believe, from some investigations I have recently made on this subject, that there is good ground for the claim. Wrought iron, properly manufactured, is, however, more expensive than steel.

There are several methods of constructing a steel pipe, but the most common are the two known as cylinder joints and butt joints. The latter are more expensive, but to my mind are more economical in the long run, everything considered. They are built with countersunk rivets like a ship's bottom, and offer the minimum resistance to the passage of the water. I have made a variety of computations to aid in the solution of the problem of the proper size and method of construction of the steel main for the city of Manila, but I thoroughly recommend before a contract is let for this important work that someone in the interests of the city be charged with the duty of visiting some of the steel-pipe industry in the United States, feeling sure that the city will be the gainer by the information secured.

It is possible that it may be found desirable to build a considerable portion of the proposed conduit line in tunnel under pressure, should



SANTA LUCIA GATE, SHOWING WIDTH OF GATEWAYS ENTERING WALLED CITY.



PALACIO STREET EXTENSION. BEGINNING WORK ON REMOVAL OF OLD SPANISH WALL.

the dhobie rock be found of proper character and to lie in a favorable position. Such a tunnel would be naturally of larger sections than a steel pipe and would save head, besides being permanent in character. Surveys and borings are now in progress to determine this question.

DISTRIBUTING RESERVOIR.

The distributing reservoir should, in my judgment, have such an elevation or flow line as to give not less than 115 feet elevation for the hydraulic grade line at the Deposito. It would be very convenient to have the filter beds and the clear-water reservoir together, and it may be found that there is a good site for a distributing reservoir upon the high land east of the Deposito, where the prism of water may be located so as to have the highest efficiency in serving the distribution system. It may be found desirable in the interests of economy to build one-half of the reservoir only at first, in which case it seems proper to give the one-half a capacity of 50,000,000 gallons.

RECAPITULATION.

The following is a recapitulation of the recommendations in this report:

- (1) The building of a storage reservoir at the gorge.
- (2) The building of a conduit line to the filters.
- (3) The building of open sand filters of a present capacity of about 10,000,000 gallons per day.
- (4) The building of a covered distributing reservoir of not less than 50,000,000 gallons present capacity.
- (5) The fixing of the hydraulic gradients so as to produce a pressure of not less than 115 feet at about the situation of the present Deposito.

The above is a practical indorsement as far as my judgment goes of the very excellent plan outlined by Major Case in his report, the principal exception being the imperative necessity for constructing the filters at the same time with the other works, and I think that developments which have occurred since Major Case made his report will lead him to agree with me that this part of the work should not be postponed.

I can not close this report without expressing my obligations to Major Case for the kindness and promptness with which he had aided me in my investigations, and for the courtesy and consideration shown me by many members connected with the city government.

Very faithfully yours,

DESMOND FITZGERALD,
Consulting Engineer.

Hon. ARSENIO C. HERRERA,
President of the Municipal Board.

DEPARTMENT OF THE INTERIOR,
BUREAU OF GOVERNMENT LABORATORIES,
Manila, P. I., March 14, 1904.

SIR: I have the honor to report as follows is regard to the work undertaken by the laboratories for the examination of the water in the Mariquina River in conjunction with its present work in examining the tap water. An extract from the report of Dr. W. E. Musgrave, of the Biological Laboratory, containing all points bearing on the water supply, is as follows:

The expedition left Manila at 2.30 p. m. March 5 in two Government wagons and arrived at Montalbon about 8.30 of the same day. Next morning a visit was made through the gorge to the proposed site of the dam for the new water supply. From here the return trip was commenced, arriving in Manila about 11 p. m. Sunday, March 6.

Samples of water for culture for both bacteria and protozoa were taken just below the junction of the two streams which form the Mariquina River, at the site of the new dam, at Montalbon, San Mateo, and Santolan.

The samples for bacteriologic examination were placed on ice soon after being taken and were kept cold until Monday morning, when cultures were made.

Cultures were made at the same time from fresh samples of water from a city tap.

The sample for colony count made at the head of the river was unfortunately contaminated. For the others the bacteria were as follows:

	Per cubic centimeter.
From the site of the new reservoir -----	208
From the river just below Montalbon -----	377
From the river just below San Mateo -----	105
From the present intake at Santalan -----	267
From the tap in city -----	194

These counts were carefully made from a large number of plates, and represent quite accurately the bacteria in the samples taken. I can not satisfactorily explain the low count in the sample from San Mateo. Some growths may have occurred in the samples during twelve to eighteen hours between the time they were taken and the time plates were made, notwithstanding they were kept packed on ice during this time.

No classification of the bacteria has been attempted. They are for the most part very free-growing organisms, and a considerable number are pigment producers. One of these latter, which has been found in all the plates, is a large, yellow pigment-producing bacillus, not pathogenic for laboratory animals, but which has been found a most uniformly satisfactory symbiotic organism for the cultivation of amebas in artificial media.

Cultures for amebas made from the same places as the bacteria already mentioned, and in addition one culture from the head of the Mariquina River, all showed numerous amebas after the usual length of time, and some of these protozoa are now being further worked out.

I know of no satisfactory method of determining actual numbers of amebas as in the case of bacteria, but they are apparently quite numerous throughout the water course.

From a sanitary standpoint there can be no question of doubt about the

advisability of changing the source of the water supply, and the judgment shown in the selection of the proposed new site is equally apparent.

As to the present location, it has not, so far as I can see, a single point in its favor. The water course is through a very fertile valley which contains probably 50,000 human beings and animals. It is traversed by several small streams which come from the mountains in various places and are all tributaries of the Mariquina River above the intake. To secure even a semblance of sanitation out of this supply would not only necessitate the removal of human and animal habitation from the valley and a large outlay of money to remove rank vegetation but would require similar care for several of the smaller streams well into the foothills at several points. And finally, above all, to keep these conditions, once they were obtained, would require a constant guard over a very large area.

In my drive from Santolan to Montalbon I saw five dead animals in varying stages of putrefaction lying in the river or its branches. Hogs, cattle, and other animals use the river as watering places, and human beings use it for bathing and laundry purposes, and it acts as an open sewer for much of the offal of several barrios.

In Montalbon I asked a sentry on duty to show me the place used as a water-closet, and was conducted to the side of a little hill containing considerable human feces. This place drained directly into the river a short distance away.

The method of disposing of the dead and many other less important but objectionable features need hardly be noted here.

The proposed new site for the water supply is, on the other hand, free from many of the objections to the present one, and is on the whole probably as satisfactory a location as could be found within a reasonable distance of Manila. The valley is narrow and the mountains high and steep on both sides. There are but few animals and very little human traffic in the region. There is, however, considerable vegetation, and a small town, Boso-Boso, is situated on one branch a few miles above the proposed reservoir.

As much as possible of the vegetation and all animal life should be removed from the entire watershed to bring the city supply within the bounds of probable safety.

With ordinary precautions the danger from bacteria in a water supply obtained from the proposed location would probably be very remote. In furnishing a safe water supply to Manila, however, another factor as important as the bacteria should be considered. Amebas play an important role in the invalidism of the city's population, and it has recently been shown in the laboratory that some of the pathogenic amebas are found in the present water supply.

I do not affirm that all amebas are pathogenic, but at the present time no practical means are known by which the pathogenic may be separated. The only safe sanitary deduction is, therefore, to regard them as all dangerous.

It has already been shown in this report that the water above the proposed new reservoir contains these parasites, and they must therefore enter into our considerations. To limit the danger from amebas in the water supply one or both of two methods suggest themselves:

First. Limit the number of amebas and bacteria in the reservoir by removing all possible organic matter from the watershed.

Second. Accomplish the same result or reënforce the first by a method of filtration.

Recent unpublished work in this laboratory by Mr. Clegg and myself has shown that within certain limits amebas are adaptable, and that this varying degree of pathogenicity is influenced by the environment of the organism. It

is apparently increased by passage through the animal organism, and it is likely also to be influenced by the class of bacteria and other substances with which it may be associated. This work has progressed far enough to indicate that the further and longer removed from animal organic matter and possibly from some bacteria quite common in man the less likely will the amebas be pathogenic to human beings on direct inoculation. This statement is offered as an additional reason for a complete removal of animal life from the proposed new watershed.

The amebas isolated from and above the proposed new reservoir will be studied more in detail and an additional report submitted if it is so desired.

In closing I wish to emphasize that provisions for a safe water supply for Manila must include methods for removal of animal parasites which are present in the Mariquina River and its tributaries.

The table of the chemical examination which is inclosed shows the composition of the water.

The results given above would indicate that in the future investigations the following course should be adopted: A model cross section of the filter which it is proposed to use should be made in a glass tube of sufficient diameter which can be furnished by the laboratories, and tap water will then be run through this filter for a long time. The water taken from the lower end will then be examined immediately after installation and at intervals afterwards in order to determine whether the amebas will finally force passage through or not. This will experimentally determine the efficiency of the filters and also whether they can be kept in use for any considerable length of time and how often cleaning must take place.

It is also suggested that the laboratories make a second expedition to the source of the water supply at the beginning of the rainy season for the purpose of determining what influence the rains will have upon the condition of the water supply. It is requested that the City Engineer coöperate with the laboratories in preparing a model of the filter to be used, and also when the rains begin assist in sending a second expedition to the source of the supply. The laboratories will send a botanist above Montalbon as soon as possible to study the vegetation in the river.

I am, very respectfully,

PAUL C. FREER,

Superintendent Government Laboratories.

Maj. JAMES F. CASE, *City Engineer.*

SUPPLEMENTARY REPORT OF MR. J. F. CASE UPON PROPOSED NEW WATER SUPPLY.

MANILA, P. I., *April 23, 1904.*

SIR: Mr. Desmond Fitzgerald, Consulting Engineer, has kindly furnished me with an advance copy of his report on the plans of the proposed water system for the city of Manila, and I desire to present the following observations, which may be considered supplementary to my original formal report:

In the first place I desire to express my pleasure at the opportunity of being associated with Mr. Fitzgerald in this work. The thoroughness of his investigations and the value of his advice in the discussions we have had, as well as his unfailing courtesy, have made our relations most pleasant and profitable to me. It is especially gratifying also to have his distinct and complete approval of my plans.

Taking Mr. Fitzgerald's report by paragraph, it will be noticed that we agree as to the quantity of water to be supplied under the head of "future requirements." The "source of supply" selected by me meets Mr. Fitzgerald's entire approval. The "watershed" and "proposed forest reserve" are agreed to. Mr. Fitzgerald's notes on "rainfall and storage" agree very closely to my own. Mr. Fitzgerald assumes somewhat more rigid conditions than I did, which may be best described by stating that my computations were based on the assumption that the three dryest seasons during the observed period might occur consecutively, while Mr. Fitzgerald's more rigid assumption is that the dryest year of the entire observed period might occur for three consecutive years. Mr. Fitzgerald's storage results are therefore somewhat in excess of my own, though I wish to call attention to the fact that the "storage reservoir" as designed by me is still of ample capacity should Mr. Fitzgerald's assumption become an actual fact.

It will be noticed that the design of the dam at the gorge is approved both as to location and section. As Mr. Fitzgerald states, all that man can do will have been done if it is built so securely that none of the forces with which we are familiar will disturb its position.

Under his discussion of steel pipe line, Mr. Fitzgerald touches on the discussion of the relative merits of steel and wrought iron. This question is a mooted one, and each side has adherents among the best

hydraulic engineers. It is my intention, and I have so written the specifications, as to receive bids for the piping of either material, and to defer the final selection pending a further economic study of the question.

With regard to the question as to whether the pipe should be constructed with lap joints or butt joints, I agree with Mr. Fitzgerald's recommendation that someone in the interests of the city be charged with the duty of visiting some of the centers of the steel-pipe industry. The carrying capacity of butt-joint pipe is larger than of lap joint, but the countersinking of the rivets will require heavier plates and more expensive construction, and it is an economic question which presents itself for solution.

The only point on which Mr. Fitzgerald differs from the conclusions expressed in my original report is the one regarding the necessity of immediate filtration. My plans provide for bringing the water to Manila without filtration for the present, but the design is such that filtration can be added at any time when experience shows it necessary or advisable. In this connection I desire, however, to state that the recent investigations of Dr. Musgrave at the Government Laboratories have thrown such important additional light on the subject, information completed since my report was written and not available to me at the time my conclusions were drawn, that I entirely agree with Mr. Fitzgerald's recommendation of filtration. We have, however, been carrying on experiments in filtration for the past six weeks, and the results so far obtained are not sufficient in my opinion to proceed with the construction of ordinary filters such as are usually constructed. These filtration experiments will be continued, and when we shall have determined a feasible method of removing the amebæ from the water supply I shall recommend the construction of the filters. I do not feel, however, that the work of construction should be delayed pending the results of these investigations. It would be comparatively easy to remove the ordinary bacteria from the water, but a purification plant should certainly reduce the danger element to as near the vanishing point as possible.

Before closing this report I desire to express my appreciation of the assistance rendered me by Dr. Freer, Dr. Musgrave, and their assistants of the laboratories. Dr. Freer has given me his hearty coöperation at all times, and as for Dr. Musgrave, abler pens than mine will record the importance of his investigations and discoveries.

Respectfully,

J. F. CASE, *City Engineer.*

THE SECRETARY OF THE MUNICIPAL BOARD,

Manila, P. I.

REPORT OF MR. OWEN L. INGALLS UPON THE SEWER AGE SYSTEM FOR THE CITY OF MANILA.

MANILA, P. I., *February 1, 1904.*

SIRS: I have the honor to submit the following report in compliance with the instructions of the Municipal Board, Manila, P. I., dated September 23, 1903, directing me to institute a study for the disposal of the sewage of this city, designing such a system as would in my judgment be best suited to the wants of Manila, and that I submit a report with drawings and estimates of cost previous to the preparation of detailed plans and specifications for the work.

INTRODUCTION.

During the time that I was filling the important position of City Engineer I made a careful study of the city of Manila and its surroundings for the purpose of acquainting myself with all features of the sewerage and draining problem that might be placed before me at no distant day for consideration, and at the same time caused a system of grades to be run and bench marks to be established throughout the city which would be the first requisite previous to undertaking this work.

A study of the grades thus determined disclosed the fact that nearly the entire area covered by the city on the north side of the Pasig River is located at or below an elevation of from 4 to 8 feet above the mean of the lower low tides, or from 1 to 5 feet above the mean of the higher high tides in the bay, and that all land situated on the south side of the river is located at or below an elevation of from 4 to 12 feet above the mean of the lower low tides, or from 1 to 9 feet above the mean of the higher high tides in the bay, the average mean daily variation in tides being about 3.1 feet. The highest water that has been observed in the bay of Manila since the American occupation has been 4.9 feet above the mean of the lower low tides, upon which occasion large sections of the city were inundated, and many streets covered with water to a considerable extent. Occasions of this kind, although possibly a little less pronounced, are not infrequent, especially during the southwest monsoons, and great care must be exercised to design a sewerage system for this city that will exclude this water and confine the operations of the sewers to the function of removing

the sewage only, in order that the system may not become overcharged under these conditions. This feature of the work will be described more in detail later in this report.

The coast-survey records indicate that the lowest water seldom reaches a point more than 1 foot below the mean of the lower low tides in the bay, which condition takes place during the northeast monsoons.

For the sake of convenience in planning future underground constructions in the city where much work will be constructed at a considerable distance below sea level, it was decided to adopt an elevation of 30 feet for city datum, which elevation is the mean of the lower low tides as established by the United States Coast and Geodetic Survey for Manila Bay.

No system of sewerage, and only a very limited system of drainage, located mostly within the Walled City and also near the banks of the Pasig River on the north side, has ever been constructed in Manila.

The drainage system as constructed is composed mainly of stone drains, built of rectangular blocks of the prevailing class of volcanic rock laid on stone foundations with brick or stone coverings, and without manholes. These drains were built in such a manner as to be quite deficient for sanitary purposes, and not entirely satisfactory for the removal of storm water from the streets.

Intramuros, being the highest and most completely improved part of the city, has naturally fared the best, and is generally well provided with storm-water drains of the class previously mentioned. All drains located within the Walled City discharge either into the river or into the moat, and as these drains during late years have been made use of for disposing of the sewage from dwellings and possibly the overflow from cesspools, the tendency has been to convert the moat into an open sewer in which the velocity of the current is so slight that nearly all solid matter from the sewage is deposited, and the odors from which cause an intolerable nuisance and a menace to public health, especially during the hot, dry season.

The conditions found to exist in the moat are also applicable in a greater or less extent to all esteros located within the city, for the reason that they directly or indirectly receive a very large per cent of all the filth accumulations from the districts through which they pass. The action of the tides and the heavy storms which prevail during the rainy season, however, keep these natural water courses reasonably well flushed and purified, but during the long, dry, hot season the offensive odors given off by these open sewers become almost unbearable.

The existence of these open water courses are very essential, both for commercial purposes and to act as a means for removing all storm water during heavy rains as expeditiously as possible from the various parts of the city through which they pass. A discontinuance of the

present sources of pollution will at once purify the esteros and remove all opposition to the continuance of a system of navigation which is largely responsible for the commercial importance of the city.

The bottoms and sides of all drains throughout the city are not water-tight and, as they are more or less uneven, the soakage into the soil of foul liquids must be very great, especially during the dry season, at which time a large amount of filthy matter necessarily accumulates and gives off offensive odors through the untrapped storm-water inlets, which are most disagreeable and detrimental to the health of the inhabitants, the inlets mentioned being the only means of ventilation for the present so-called public sewers.

POPULATION.

The population of the city at the present time, as determined by the recent census, amounts to 223,000 persons, of which number over 16,000 have no place of abode except upon the water, living in boats of various kinds.

By districts it was ascertained that 29,440 people resided in San Nicolas, 40,440 in Tondo, 34,920 in Santa Cruz, 19,120 in Sampaloc, 8,890 in San Miguel, 16,760 in Binondo, 11,300 in Quiapo, 11,540 in Intramuros, 13,150 in Ermita, 6,350 in Paco, 8,550 in Malate, 2,990 in Pandacan, and 3,230 in Santa Ana.

Attention is invited to the inclosed map which indicates the density of population by enumeration districts which was copied from the census returns of 1903 for this city.

In designing a sewerage system for a large and growing city provision must necessarily be made not only for the requirements of the present but also for the future population. No reliable records of the past growth of the city can be obtained, and if they were available it is doubtful if they would be of material use, owing to the changed conditions which are likely to be brought about in the next few years.

The indications are that the rate of growth previous to this time has been very much less than that which has taken place in cities of the same size in the United States.

The population in some parts of the city is extremely dense at the present time, especially along the bay in the districts of San Nicolas and Tondo, where an average population of 350 persons to the acre may be found, and in some of the more densely residential portions of these districts a population of from 500 to 600 people to the acre have been discovered.

Binondo, Santa Cruz, and Intramuros are also districts almost completely built up, and have a population averaging about 150 persons to the acre.

The future growth of the city will doubtless be very largely confined to the suburban districts, and in designing this system ample provision

has been made for such conditions. A table indicating the present population and the estimated future growth for the city by districts may be found in the appendix accompanying this report, said table also furnishing an estimated future population per acre, together with a maximum flow of sewage in cubic feet per second per acre for each district, which table will be made use of in calculating the sizes of sewers necessary for providing proper drainage for every section of the city.

This system of sewers has been designed for a city varying in population from 50 inhabitants per acre residing in certain suburban residential localities to 360 inhabitants per acre living in the more thickly built-up portions, giving upon this basis an ultimate population of 441,325 persons residing in this city, irrespective of those who may live upon the water and who are likely to number at least 25,000 persons whenever the city shall have attained the population indicated.

The above assumptions are based upon an estimated future growth of the city which is likely to be attained in from fifty to sixty years.

OBJECT TO BE ATTAINED.

It is quite unnecessary to enter into a discussion at this time regarding the existing needs of a well-designed and properly constructed system of sewerage for this city. It is generally admitted by all who are familiar with the situation and interested in the health and general welfare of the citizens and the growth and improvement of the city.

The object to be attained by the introduction of a complete sewerage system is to remove as quickly and expeditiously as possible all liquid wastes from dwellings and stables, the filth from hospitals, slaughter-houses, manufactories, and tanneries, and cause the disposal of these wastes in such a manner that no possible harm can arise therefrom. The resultant of this flow at the present time is the pollution of the soil or the water over which or into which it is allowed to discharge.

In designing works of the magnitude required for Manila there should be due regard for economy, not only as to the first cost of construction but also as to the cost of maintenance when the same is completed and fully in operation.

At the present time there are but two methods of sewage disposal in general use, one of which is known as the combined system which provides not only for the removal of drainage from dwellings and buildings but also for the removal of storm water from the streets, court-yards, and roofs.

The other is known as the separate system, by which method only house sewage, liquid wastes from manufactories, etc., are admitted to the sewers, whose dimensions have been proportioned to the volume of sewage passing through them, letting the storm water flow upon the

surface of the streets or providing for its removal by means of storm drains.

The amount of sewage conveyed by such a system of sewers is consequently very uniform, and when properly constructed there are no accumulations or deposits which generate noxious gases only to be removed at the time of severe storms. The sewers constructed upon the separate system will be daily filled to their greatest carrying capacity at the hour of maximum flow, and all lines will be daily swept clear of solids, thereby preventing any putrefactive change taking place during the rapid movement of the sewage to the point of discharge.

METHOD OF DISPOSAL.

The first question to be answered in solving this problem relates to the manner of finally disposing of the sewage, for upon this decision depends the character and management of most of the works within the city. The fundamental requirement for a proper disposal in this case is that the sewage shall be purified either directly or indirectly, or rendered innocuous and thus prevent the unhealthful and otherwise objectionable conditions resulting from the putrefaction of organic matter in the neighborhood of human habitations.

The purification of sewage is accomplished by an oxidation of its organic substances through the agency of microbes in the presence of a sufficient supply of oxygen.

In practice this can be accomplished by allowing the sewage to percolate intermittently through a porous soil or by largely diluting it with water. In both cases the necessary oxygen can be supplied from the air contained in the interstices of the soil or dissolved in the water. The bacterial work in converting the organic into inorganic matter is comparatively slow, especially when crude sewage is discharged into a body of water, as the amount of oxygen required is large. For the reasons stated, a considerable amount of land or a very large quantity of water are respectively required.

The methods of sewage disposal that have been most commonly adopted may be spoken of as dilution, filtration and irrigation, chemical precipitation, and in addition a system of sewage purification which had its origin and greatest development in England and which has within a few years received much attention in an experimental way and been adopted in a number of places in America, that of the so-called "septic system."

DILUTION.

Dilution contemplates the discharge of sewage in its crude or unclarified state into a nearby body of water at such a point as would cause the same to become so thoroughly and completely disintegrated by the action of the waves that there would be little or no danger of its becoming

offensive. All sewage when sufficiently mixed with a large volume of water becomes entirely inoffensive, and chemical changes at once begin to take place which will in time purify the whole mass. This process of purification is not very rapid, but being a process of oxidization, no offense is caused thereby. All floating material which would be likely to strand along the shore and cause a nuisance should be caught and removed from the sewers by means of screens and hoists located on the shore.

FILTRATION AND IRRIGATION.

A complete purification of sewage can be effected by applying it properly upon porous land. The first part of the process is the straining of the sewage and the retention of the larger particles at or near the surface, where they are exposed to and largely broken up by the effects of sunlight and air. The smaller particles and the soluble impurities found in the sewage descend into the earth to a greater or less depth, depending largely upon the character and fineness of the soil, when particles of sewage are arrested and dampen or coat the particles of the soil. The remaining part of the process of purification consists in permitting a sufficient exposure of the sewage in these thin films to the action of microbes and oxygen contained in the interstices of the soil, by which process impurities are changed into harmless compounds, after which the purified liquid may descend still deeper into the earth, or it may flow off in underground drains constructed for that purpose.

The primary requirements for sewage purification upon land are:

First. That the soil is sufficiently porous to permit a given quantity of sewage to percolate slowly through it to a sufficient depth below the surface, usually about 5 feet, where either artificial or natural drainage removes the purified water.

Second. The application of sewage must be uniform in order that the soil may become evenly moist, and must likewise be intermittent, so that the soil is alternately exposed to a thorough penetration of air. A certain amount of time is likewise required for the change, largely depending upon the character of the sewage and the porosity of the soil. Under favorable conditions from 20,000 to 30,000 gallons of sewage can be purified per acre.

In distinction, however, to the process just described, it is frequently found more desirable in warm climates when the soil is not porous to resort to the process known as irrigation in the purification of sewage.

By this process only so much sewage as will be beneficial to the vegetation is applied to the land, and the prime object to be attained is the profit that may be derived from the growing crops.

In irrigation a much larger area is necessarily required for sewage purification than when filtration is practiced. As the flow of sewage from a city is continuous, there must always be a sufficient amount of land available to receive it, and after heavy rains the ground is

so wet that the additional sewage becomes very injurious to crops. Under the conditions which prevail in Manila it is believed that neither filtration nor broad irrigation are possible. The marshy nature of the entire country surrounding the city renders the question of land purification of sewage by means of filtration or broad irrigation unworthy of further consideration.

CHEMICAL PRECIPITATION.

Wherever it has been found necessary to purify sewage it has been quite customary in the past to resort to a process known as chemical precipitation. This process consists in the collection of the sewage in large tanks, at which time it is mixed with certain chemicals, the result of which combination is to precipitate all matters held in suspension and some impurities held in solution, leaving a comparatively clear and odorless effluent, which process, however, does not alone produce a complete purification of the sewage but renders it susceptible to further purification upon a much smaller quantity of land, or its discharge into a less volume of water, without causing offense.

The deposited matter or sludge is a product containing about 90 per cent of water, and may be either pumped into barges and carried to sea or it may be consolidated by means of filter presses, after which it is easily handled in carts and used for filling low lands or as fertilizer in case it is found to possess any value as such.

It will be seen that the chemical treatment requires large tanks for collecting the sewage, machinery for mixing chemicals and for handling the sludge, besides the chemicals themselves, and a large force of men for the operation of the works.

The process of sewage purification just described, wherever adopted, has generally been very unsatisfactory, not entirely inoffensive, and is already considered out of date as an economical and efficient method of sewage disposal.

The enormous expense incurred in operating a system of this kind renders it quite certain that at no distant day methods of sewage disposal of this kind will entirely give way to a system about to be described which is said to accomplish practically the same results at a very much less cost for operating expenses.

SEPTIC TANK.

In addition to the methods of sewage purification that have already been described, some mention should also be made of a system of sewage purification which has commanded a considerable attention during the last few years, and has already been adopted in a number of places. This system is known as the "septic tank" by which arrangement the sewage is collected in tanks, from which light and air are excluded as much as possible.

The tanks are constructed of masonry and designed to hold from one to two days' accumulation of sewage. In the passage of sewage through a septic tank, which usually takes about twenty-four hours, it undergoes a fermentation, which is caused by the action of bacteria in the sewage. The septic tank is not a complete system of purification in itself, and only under the most favorable circumstances is it said to give effluents which are inoffensive. This process effects one great change in the sewage by breaking down the suspended matter, some of which disappears in the form of gas, while other portions are dissolved into solution. When the fermentation period is properly adjusted, the effluent will be found tolerably free from suspended matter, and in a condition where it is most easily oxidized by filtration.

After the sewage undergoes fermentation, the effluent is drawn from the tanks and treated on filter beds. These beds are usually constructed water-tight, underdrained, and filled to a depth of from 4 to 6 feet with both coarse and fine particled matter, such as sand, broken stone, coke, or gravel. The underdrains are provided with gates so constructed that they may be closed to prevent the escape of effluent from the beds. When the gates are closed the filter beds are filled with the effluent from the septic tanks, allowed to rest a few hours full, and then emptied. An interval of from three to four hours then ensues in which the air is permitted to thoroughly permeate the interstices and effectively oxidize the organic impurities from each liquid dose, after which the operation previously described is again repeated. By the method of treatment just described it has been found that from 200,000 to 500,000 gallons of sewage per acre per day is a fair allowance for purification.

The purification of sewage by the septic-tank system is due to the action of two classes of bacteria, one class known as "aërobic" and the other as "anaërobic."

The former class is found principally in the filter beds and seems to require light and oxygen, and can not work well without these conditions. The latter class is found in large quantities in the sewage contained in the septic tank, and works best where light and oxygen have been excluded.

The effluent from the filter beds of the septic-tank system is said to be equal to or better than that obtained by chemical treatment, and that, too, without the cost for chemicals, and also without the accumulation of sludge, the expense of treating which amounts to a very large item in the cost of operation.

The method of sewage purification just described would be very expensive if adopted for this city, both as to first cost and also for maintenance, and there is considerable doubt as to whether the effluent could safely be discharged into the bay unless carried some distance from the shore.

On account of the many reasons which have already been stated

it seems quite unnecessary to further discuss the advisability of introducing and maintaining any system of sewage purification in this city, and now consider the question and advisability of discharging the sewage directly into the bay in its crude form at such a convenient point or points and at sufficient distances from the shore that it will in no way return and cause a nuisance or become a menace to the public health.

DISCHARGE INTO THE BAY.

At this time it is well to consider in a general way what troubles are likely to be caused by the discharge of crude sewage into a body of water:

(1) By insufficient dilution the sewage may cause the entire body of water to become offensive to the senses.

(2) The particles of suspended matter in the sewage may be deposited where they will putrefy and give off bubbles of offensive gases.

(3) Coarse substances floating in the sewage or upon the surface may be transported by the currents and winds and become stranded along the shore.

In regard to the first of these troubles it has been found by experience that where sewage is mixed with a sufficient volume of water it becomes entirely inoffensive and chemical changes at once take place which will in time purify the whole mass. When sewage is not sufficiently diluted to render it harmless it may in time become very offensive.

In regard to the second-mentioned trouble, it is known that many particles held in suspension by the current in the sewers settle when the sewage is discharged into water which is still or moving with only a sluggish current. The accumulation of these particles when covered with polluted water causes them to putrefy and give off offensive gases, and in cases of exposure at low tide these deposits become very offensive. On the other hand, when sewage is discharged into strong currents the suspended particles become so thoroughly scattered and disseminated that they will purify by oxidation without producing any evil effects.

The third trouble which has been mentioned can be readily obviated. It is well known that few coarse substances float in sewage or upon the surface, especially when it is carried long distances and agitated by one or more sewage pumps. All substances found in sewers that are likely to float in the bay and cause trouble by stranding along the shore can be intercepted and removed by suitable screens and filth hoists constructed in the sewers at or near the pumping stations.

Float observations have been taken at various points in the bay opposite the city for the purpose of selecting the best locations for sewage disposal.

A few observations were taken during the month of August last,

and have been continued, although with some interruptions, during the months of December and January, and should be continued if possible throughout one entire year for the purpose of ascertaining what changes, if any, take place in the directions and velocities of the currents in Manila Bay during the varying stages of the tides and the different directions and intensities of the wind. All observations taken up to this time disclose the fact that the water in all parts of the bay has a perceptible velocity varying from a small amount to 1,500 feet or more per hour. It has also been ascertained that the velocity of the currents is invariably greatest near the surface of the water.

While the direction and intensity of the wind undoubtedly governs to a large extent the movements of the water in all parts of the bay, yet the direction of the currents seems to be largely influenced by other conditions. This was particularly true of all observations taken off the Ermita shore, where the floats generally took a southerly direction irrespective of the direction of the wind.

So far this office has been unable to determine any relation existing between the tides and currents in the bay, nor has it been possible to arrive at any theory as to what conditions are responsible for the movements noted in this large body of water.

All float observations taken in the bay opposite San Nicolas and Tondo, except near the mouth of the Pasig River, indicate that there is a wide variation in the direction of all currents at this season of the year.

The tendency has been for most floats to move in an easterly direction with an average velocity of about 11 feet per minute, indicating that the currents are generally toward the shore. This would be very undesirable and be likely to retard the proper purification of all sewage discharged in that locality.

After a careful study of all float observations and from a personal examination of the locality, it is my opinion that the sewage collected from that part of the city lying north of the Pasig River can safely be discharged into the bay at a point 2,500 feet west of the lighthouse, and that the same will be carried out into the bay and become so thoroughly diluted and disintegrated by the action of the current and waves that there will be little or no danger of its becoming offensive or of any part reaching the shore, and becoming stranded and exposed at the time of low tide. This outlet will dispose of nearly four-fifths of the entire amount of sewage under present conditions, and will probably dispose of over three-fifths of the flow when the city will have doubled its present population.

Nearly all floats which were started at points in the bay from 2,000 to 3,000 feet from shore opposite Calle Herran for the purpose of selecting a location for the discharge of all sewage collected south of the river, disclosed the fact that the resultant current was found to

be moving in a direction southeast by south, with an average velocity of about 13 feet per minute, and as the general direction of the shore line from the Luneta to Pasay is south-southeast, the resultant current was found to be gradually approaching the shore line until reaching a point opposite Fort San Antonio de Abad, where the direction invariably changed to one parallel to the shore.

From these observations it is fair to presume that the small amount of sewage collected south of the Pasig River can safely be discharged into the bay on the line of Calle Herran at a point 2,500 feet from shore in an 18-foot depth of water at low tide, without causing any offense whatever.

Further float observations should be made for the purpose of establishing the fact that the conditions already found to exist do not materially change at other seasons of the year.

RECOMMENDATIONS.

After a careful review of the entire situation I am thoroughly convinced that a separate system of sewers, by which is meant a system caring for the sewage only, is the best for the city of Manila, and I therefore recommend its adoption, leaving the question of storm-water disposal for future consideration, to be studied in connection with a project for the canalization of the esteros. I would further recommend that the sewage of Manila be raised and discharged into the bay without previous treatment, at two points, by means of pumping stations and outfall sewers located upon opposite sides of the river. The points of discharge to be situated at sufficient distances from the shore so that the sewage will in no way become offensive, or be likely to cause a nuisance or a menace to the health of the community.

DESIGN.

No startling or untried principles have been employed or attempted in the design of the sewerage system for this city, but well-known methods which have been and are being employed in other cities have been the basis for this report.

The plan as drawn has in view the immediate sewerage of the built-up portions of the city with provision for extensions of the system to accommodate future growth, whenever the demands warrant such extension.

The present plans embrace a territory covering fully the districts of San Nicolas, Binondo, Quiapo, and Intramuros, nearly all of Ermita, Santa Cruz, and San Miguel, and a large part of the districts of Tondo, Malate, Sampaloc, and Paco. These plans cover an area of nearly 5 square miles and necessitate the construction of about 52 miles of sewers for present use.

The estimated amount of flow which is to be provided for in a sewer-

age system is derived from two sources—house sewage and ground water. The amount of house sewage reaching the sewers of Manila is based upon a consumption estimated at eighty gallons of water per capita in each twenty-four hours, with a maximum flow in the sewers estimated at the rate of 120 gallons per capita per day. This per capita estimate of water consumption is considerably greater than has generally been allowed by English engineers in designing sewerage systems for certain oriental cities located within the Tropics, which systems are said to be working very satisfactorily, yet the water-consumption allowance which has been chosen for Manila is but a little more than one-half the amount that has been generally considered a fair allowance by American engineers for cities in the States that have been provided with ample water supplies.

The ground-water flow reaching the sewers has been estimated to amount to about one-third the annual rainfall, or 1,250,000 gallons per square mile in twenty-four hours. This estimate of ground-water infiltration is considerably larger than is generally allowed in sewer design for the reason that nearly all sewers proposed for construction in Manila will be laid at a considerable distance below sea level in a soil that is largely saturated with water, necessitating the exercise of extraordinary care and precaution in all sewer construction and plumbing work to exclude the seepage to an extent sufficient to keep even within this estimate.

Owing to the peculiar topographical features existing in Manila, where the natural conditions for drainage are entirely wanting and where it will be found necessary to create the required fall by increasing the depths of all sewers from their sources toward the pumping stations, the question of minimum depths and minimum rates of grade become of the utmost importance, for the sake of economy in the first cost of construction as well as economy in the cost of operation.

As there are no basements or cellars in the city of Manila, and as there are few, if any, underground constructions that are likely to be interfered with, it has been decided that a 5-foot minimum depth to the bottom of the sewers will be necessary for the purpose of affording a proper slope for all house connections and furnishing a sufficient depth for the introduction of a suitable flushing system. It has also been thought best to recommend the laying of no public sewers less than 8 inches in diameter, which size constitutes over 66 per cent of this entire system.

The value of μ —.013 in the Kutter formula has been used in determining the sizes required to accommodate the flow in all pipe and brick sewers, and all sewers have been destined to have a velocity of not less than two feet per second when flowing one-half full. Upon this assumption an 8-inch pipe will require a slope of 1:250 in order to secure the requisite velocity. As the sizes of the sewers increase the slopes dimin-

ish until a 24-inch pipe when used will be laid at a slope of 1:1,000, having a velocity of 2.26 feet per second when running one-half full.

Beginning with an 8-inch sewer, the size gradually increases as the flow increases, until the largest sewer finally attains a diameter of 5 feet previous to reaching the main pumping station. Sewers up to and including 24 inches in diameter are to be constructed of American vitrified sewer pipe, or of a pipe equally as good in quality, and those above that size will be constructed either of brick or of concrete, whichever is found cheaper and more desirable for this locality, with bases generally rectangular in form, resting upon timber foundations.

Attention is respectfully invited to a table found in the appendix of this report which gives the slopes for the various-sized sewers that are proposed for Manila, together with the computed velocities in feet per second, and also the discharge for each sized sewer in cubic feet per second.

For the purpose of securing strength in the construction as well as economy in the cost of operation it was decided to recommend the construction of the main sewers circular in form in all territory that is well built up and likely to furnish a good initial flow. It was also found necessary to recommend the construction of egg-shaped or oval sewers for certain localities where the flow will be so small for many years that it will be impossible to secure the necessary initial velocity for self-cleaning in any other way.

All sewers up to and including 18 inches in diameter have been designed to carry the maximum quantity of sewage and ground water when flowing one-half full, leaving one-half the capacity for emergencies. Sewers 21 inches in diameter have been designed to flow 0.6 full and larger sizes 0.7 full; the larger areas served generally insuring a more nearly constant and uniform discharge, making so large a margin or coefficient of safety quite unnecessary.

The main intercepting sewer proposed for construction along Paseo de Azcarraga from the bay to Calle Cervantes, as well as both outfall sewers, have been designed to carry a daily discharge equivalent to a per capita consumption reaching the sewer of 100 gallons, besides the ground-water infiltration. This estimate was based upon the assumption that as the drainage area increases in size the tendency toward a uniform flow becomes more marked.

Mention has already been made that the sewerage system of Manila has been designed for a population estimated at a little more than 441,000 persons, from which estimate the run-off of the various sewers has been calculated in accordance with the estimated rates of population per acre for the various districts of the city. This system of calculation, however, has not been followed in some of the more remote parts of the city where the present population is very limited, where the street extensions have not yet been fully developed, and where

the direction and density of the future growth is very uncertain. In these localities it has been thought more desirable to simply make provision for future extensions of the system whenever the growth of the city will have sufficiently increased to warrant such extensions. Of the districts mentioned above one is located in Tondo north of the bridge crossing the Canal de la Reina. It is the intention to terminate an egg-shaped sewer at this point for the present, where provision will be made for a lift pumping station and a further extension of the system to the north of sufficient size to accommodate 20,000 people. A temporary connection should be made to the canal for flushing the main sewer as often as required.

Provision has also been made in the Calle Cervantes main sewer to accommodate 20,000 people living to the northward of the San Lazaro Hospital whenever the growth of the city in that direction will warrant such an extension to be made, at which time a lift pumping station will be required in the vicinity of the proposed present terminus.

The main intercepting sewer which is proposed for construction on the north side of the river along Paseo de Azcarraga and Calle Alix from the bay eastward to the Rotunda has been designed of sufficient size to accommodate 30,000 people who are likely to reside in the Sampaloc district to the east and north of the proposed present terminus. Whenever such an extension takes place a small lift pumping station will be required in the vicinity of the Rotunda.

Provision has also been made in the main sewer passing along Calle Herran for the accommodation of 20,000 people living to the eastward of Estero de Paco in addition to the 12,000 people now residing there. This system is intended to accommodate the districts of Santa Ana and Pandacan whenever they have attained a population sufficiently great to warrant such extensions.

All main outlet sewers located at the various points mentioned above will be provided with so limited a flow in the beginning that it has been deemed advisable to recommend that they be constructed oval in form, thereby securing a sufficient velocity even with a small flow to render them self-cleaning. Provision will also be made for pipe connections with esteros wherever possible for the purpose of securing additional water for flushing and cleaning the same as often as may be found necessary.

GENERAL DESIGNS FOR SEWAGE COLLECTION.

On account of the narrowness and irregular plan or arrangement of most streets now in existence on the north side of the Pasig River it was found almost necessary to select the broad avenue with its numerous names beginning at Paseo de Azcarraga upon the bay and extending to the Rotunda for the line of the main intercepting sewer on that side of the river. Fortunately this avenue was admirably situated

for such a purpose, as it divides that part of the city into two reasonably equal parts in so far as it relates to the lengths of lateral sewers that will be necessary for present requirements.

The initial size of this intercepting sewer will be 5 feet in diameter and will decrease in size to 2 feet 3 inches by 3 feet 4½ inches (oval sewer at the Rotunda terminus). It will be about 13,000 feet in length, and will be laid generally at depths of from 14 to 19 feet from the surface of the street to the grade or bottom of the sewer inside. The sewer will be provided with two lift pumping stations, in addition to the main pumping station located upon the bay, which will be made use of for the purpose of repumping the sewage to gain grade and prevent excessive depths.

The method of lateral collection is in no way governed by the surface slopes, as there are but slight variations in street elevation to be found in any parts of the city.

The controlling features governing the entire design of this system has been to rapidly concentrate the flow near the upper ends of the sewers to avoid unnecessary depths, due to long runs of 8-inch pipe, which is the initial size, and which requires more rapid fall for securing the requisite velocity than is found necessary in the larger-sized sewers. The object sought has also been to secure at the same time the shortest obtainable lines.

The sewage is delivered through the submains to the main interceptor, generally at depths of from 12 to 16 feet.

One main pumping station and two small pumping or lift stations will be required for the present needs of the city on this side of the river.

All sewage found south of the Pasig River in the city will be collected at a main pumping station to be located near the bay on the line of Calle Herran. A main intercepting sewer 4 feet in diameter will be constructed from this pumping station along Calle Herran, as far as Calle Nueva, where the line will divide, one part extending to the northward along Calle Nueva, across Wallace Field, and into the Walled City, serving all of Intramuros and nearly all of Ermita, while the other line will continue along Calle Herran, ending in Paco for the present, and designed to be eventually extended to Santa Ana and Pandacan. The depths of these intercepting sewers will vary from 14 to 19 feet, and the sizes from 2 by 3 feet to 4-foot diameter.

A proper disposition of the sewage on this side of the river will necessitate the erection of one main and two small lift pumping stations to be hereafter described.

The system of sewerage as outlined for the southern part of the city makes provision for a large mileage of sewers which will be required at some future time whenever the streets shall have been dedicated and structures erected that will require drainage. These proposed sewers, however, have not been included in this estimate of cost.

Provisions have also been made that will necessitate acquiring rights of way across certain large pieces of unimproved property situated at the east of Camp Wallace, for the purpose of constructing sewers that will be required as outlets for the sewers located in Calle San Marcelino and Calle Marques de Comillas. It is believed that little expense and no trouble will be encountered in securing all rights of way that may be necessary to carry out this plan.

About one dozen estero crossings will be found necessary throughout the city to accommodate the various-sized sewers. These crossings, to one unfamiliar with the work, might be considered obstacles of considerable importance. Care has, however, been exercised in selecting points for crossings that would be likely to cause the smallest expense and give the least amount of annoyance when under construction. The tops of all sewers at these crossings have been fixed at an elevation of not to exceed 25 feet, which will afford a depth of 5 feet of water in the esteros at the time of low water in the bay and interfere in no way with prospective navigation. At the present time the depths of water in the esteros at most proposed sewer crossings are very slight, especially at the time of low tide.

This plan will necessitate the construction of two lines of inverted siphons, one line to be located on Calle San Fernando, crossing the Estero de Binondo and requiring one cast-iron pipe 20 inches in diameter, the other crossing to be located on the line of Calle Gandara over Estero de San Jacinto and will be of cast-iron pipe 16 inches in diameter. All additional crossings that will require modified sewer sections are located along Paseo de Azcarraga between Calle Cervantes and the bay, at which points double lines of 36-inch cast-iron straight pipe in lengths of a little more than 100 feet will be found necessary. The engineering features connected with this part of the work are comparatively simple and inexpensive.

MAIN PUMPING STATIONS AND OUTFALL.

To pump the entire sewage of this city and discharge the same into the bay at a point located a mile or more from the shore might at first appear to be an undertaking too serious to attempt. The difficulties, however, that would be encountered here are not great, and there are many examples in existence or proposed for construction in other cities where much or all of the sewage is thus artificially raised and disposed of.

The general system of sewerage designed for this city contemplates the erection of two main pumping stations, each located upon the bay, one at the foot of Paseo de Azcarraga, which disposes of all sewage collected from that part of the city situated north of the Pasig River, the other located at the foot of Calle Herran and serves as an outlet for all sewage collected south of the river. Four small pumping or lift stations will

also be required to accommodate the present needs of the city, two located upon the north and two upon the south side of the river.

The location of sewage pumping stations in the vicinity of habitations might at first be considered a question of doubtful merit. Such stations, however, have been and can be constructed and maintained in any locality, properly ventilated if found necessary, without producing any offense whatever.

Sewage carries with it much solid and bulky matter, such as sticks, fruit skins, rags, and occasionally dead animals, and a great variety of things which find their way into sewers. In order to prevent this bulky matter from interfering with the pumping machinery and also prevent the same from floating upon the bay and becoming stranded along the shore in the vicinity of habitations during the strong winds, it will be necessary to construct screens and filth hoists at the main pumping stations to catch all coarse floating matter and arrest all bulky material. These screens should be located near the pump wells and arranged in duplicate, so that one screen will always be in place while the other is being cleaned. Provision should also be made for properly disposing of all collected floating material, so as not to cause a nuisance. This can generally be best accomplished by cremation at the main pumping stations. Of the total future population provided for in the proposed sewerage system, 319,000 people are estimated to reside within the city on the north side of the river, or a little more than double the present population, while the system on the south side of the river has been designed to accommodate about 123,000 people, or a little more than two and one-half times the population now residing there.

The amount of sewage to be accommodated by the outfall on the north side of the river when that part of the city shall have reached the anticipated population is estimated, together with ground water, to amount to 30,500,000 gallons per day, at a rate of flow equal to the average amount of water consumption, while at the maximum flow it would be at the rate of 43,500,000 gallons per day during a portion of the twenty-four hours. This outfall sewer has been designed to carry a maximum rate when flowing full of 37,000,000 gallons per day, which is at the rate of 57 cubic feet per second. The total lift at this pumping station at the time of mean high tide, including friction head in the force main, is 24.1 feet, necessitating 157 horsepower while pumping the estimated quantity of sewage per day. This will require the installation of three 18,500,000-gallon pumps with 300-horsepower boiler capacity to do the work and at the same time have sufficient reserve. Two discharge pipes of cast iron, 36 inches in diameter, will be required, each having a flow with a velocity of 4.05 feet per second when discharging the full amount of sewage. One 36-inch outfall pipe, two pumping engines of 16,000,000 gallons capacity each, and three

boilers of 60 horsepower each are recommended for the present requirements.

The total amount of sewage to be accommodated on the south side of the river, including ground water, is estimated to amount to 13,500,000 gallons per day normal flow, while the flow at the maximum rate will amount to 18,500,000 gallons per day for a portion of each twenty-four hours. Provision has been made in the outfall sewer for a rate of flow equal to 15,600,000 gallons per day, which will give a rate of discharge equal to 24.1 cubic feet per second.

The total lift at this station at the time of mean high tide, including friction head in the force main, will amount to approximately 22 feet, necessitating 60 horsepower when pumping the average amount of sewage per day. This will require three 8,000,000-gallon pumps with 120-horsepower boiler capacity to accomplish the work and at the same time have sufficient reserve.

Two discharge pipes will be found necessary, each 24 inches in diameter, having a flow with a velocity of 3.87 feet per second when discharging the full amount of sewage.

For present purposes it will not be necessary to lay more than one of the 24-inch outfall pipes or to install more than two pumps and engines of 7,000,000 gallons pumping capacity each, together with two boilers of 50 horsepower each.

It is believed that centrifugal pumps coupled to compound condensing engines should be used in the main pumping stations.

OUTFALL PIPE.

The outfall sewers from the pumping stations to the terminus should be laid with cast-iron pipe upon the bed of the bay in a dredged channel and on a pile foundation.

The outlet end of each line of pipe should be surrounded by a timber casing filled with Portland-cement concrete masonry surmounted by a cut granite cap, and the whole resting upon a group of piles if found necessary.

LIFT PUMPING STATIONS.

The pumping station located at the intersection of Calle Arranque and Calle Paz, together with all other pumping stations not heretofore described, will be classed as lift stations, in which it has been decided to recommend the use of electric power.

At each of these stations the sewage will be raised but a small amount, generally about 6 feet. Each pump will be provided with an automatic regulating device, and each will be directly connected by means of a belt or shaft to an electric motor, which will go into operation whenever the level of the water has risen to a certain height on the suction side of the pump, and will then gradually reduce in speed as lower elevations

of the water are reached, and will go out of operation whenever the water shall have been pumped to a certain lower level. As soon as the water has again risen to the higher elevation the cycle will be again repeated.

The lift pumping station mentioned above is the most important and largest of the number, and has been designed to care for an ultimate flow of 23,000,000 gallons of sewage and ground water per day. The amount of flow for the present population is estimated at 12,000,000 gallons per day, or 17.5 cubic feet per second. The sewage will be delivered in a 4.25-foot circular sewer at an approximate grade elevation of 19 feet, and be discharged into a sewer of the same size with an approximate grade elevation of 23 feet. To perform this work and at the same time have sufficient reserve will necessitate the installation of two centrifugal pumps driven by electric motors, each capable of raising 12,000,000 gallons of sewage per day.

The lift pumping station, to be located near the intersection of Calzada de Iris and Calle Alix, has been designed to care for an ultimate flow of 14,700,000 gallons of sewage and ground water per day. The present needs of the city will require pumps and motors capable of lifting 5,400,000 gallons per day, or a little more than 8 cubic feet per second, through an elevation of about 5 feet.

To perform this work and at the same time have sufficient reserve will require the installation of two motors and two centrifugal pumps, each capable of lifting 5,000,000 gallons of sewage per day, or 7.7 cubic feet per second.

Of the two lift pumping stations which will be required on the south side of the Pasig River, one will be located on Calle Herran at the west end of the bridge crossing the Estero de Paco and the other will be located at the corner of Calzada de Vidal and Calle Nozaleda. For the present each of these stations will be called upon to handle but about 600,000 gallons of sewage and ground water per day, or about 1 cubic foot per second, through an approximate elevation of 6 feet. To perform this work will necessitate the installation of one pump and one motor in each station capable of lifting 600,000 gallons of sewage per day.

HOUSE CONNECTIONS.

Provisions should be made along all lines of sewers generally at intervals of about 40 feet for the introduction of house-drainage connections. All house connections will be from 4 to 6 inches in diameter, and should be laid by a registered plumber under the supervision of the city. All pipes should be laid in the most approved manner for the purpose of preventing the intrusion of the roots of trees and also for the purpose of preventing as far as possible large amounts of ground water infiltration which will be likely to take place around all sewer connections even when laid under the most favorable conditions.

Owing to the unstable nature of the soil in and about the city, and also on account of the excessive depths at which many of the sewers will be laid, it has been decided to recommend for the deeper sewers the introduction of Y-branches in pipe sewers and slant pipe entering main sewers above the springing lines to which will be connected 6-inch terra-cotta standpipes terminated with V-branches at elevations of from 4 to 5 feet from the surface of the street, which depths below the surface are believed to be sufficient to afford a proper grade for all house lateral connections and will in no way interfere with future underground constructions. These standpipes, with properly sealed terminals, will be located within the line of the sewer excavation and introduced at the time of the sewer construction previous to back filling the trench and at very small expense. In order that house connections may be made with these standpipes, it will be necessary to carefully locate all terminals before covering or back filling the trench.

MANHOLES AND SEWER VENTILATIONS.

Manholes should be constructed at all street intersections, at all angles in the line of sewer, and generally at intervals of from 300 to 400 feet.

The securing of proper ventilation in sewers is a matter of great importance, for without it a sewer can not be maintained in a proper sanitary condition. Up to the present time no single method of sewer ventilation has been found which has given entire satisfaction and which can be said to be generally applicable to the conditions found to exist in all large cities.

The best solution of this problem is to provide ample water for keeping the sewers clean by removing all putrescible substances as quickly as possible, thereby preventing the formation of noxious gases and at the same time to provide numerous and ample openings for the admission of fresh air to aid in promoting circulation. On account of its simplicity and for the want of a better method, engineers have for many years advocated the introduction of manholes with perforated covers as the best and simplest method for sewer ventilation. This method, however, can not be recommended for the sewers of Manila on account of the large number of streets that are flooded with storm water at the time of each hard shower, and also on account of the flooding of large sections of the city which sometimes takes place during the wet monsoon, caused by the action of the tides combined with the extreme high stages of the water along the river. Perforated manhole covers would admit large quantities of storm water to the sewers on occasions of this kind and cause the same to become overcharged for quite long periods and would also admit large quantities of sand and mud to the sewers from the unpaved streets, which would settle to the bottom and in a short time become a source of great annoyance, due to the accumulation of deposits along the interior of most lines of sewer.

In a city of narrow streets like Manila manholes should also be constructed as nearly air-tight as possible for the purpose of preventing the pollution of the atmosphere near open doors and windows, which might be caused by the escape of noxious gases from the sewers at the surface of the streets.

Having eliminated the idea of making use of perforated covers on sewer manholes for the purpose of securing sewer ventilation, it will generally be found necessary to rely upon the house connections to secure the requisite result.

It is believed this can be satisfactorily accomplished by omitting the running trap and continuing the soil pipe and vent stack on each house lateral full size through and above the roof, all pipe joints being necessarily made air-tight and all house fixtures at the same time carefully trapped and properly ventilated.

Special devices for the admission of air may be found necessary for equalizing the pressure in flush tanks in order to insure their discharge in a proper manner.

FLUSH TANKS.

It is very essential that the sewerage system be kept clean and free from deposits. The system proposed for Manila has been designed to accomplish that result whenever the ideal conditions shall have been realized, which is that of having the sewers flowing at least one-half full.

In the primary lateral sewers, however, the amount of sewage will usually be found insufficient to keep the sewers clean, and there some artificial method of flushing becomes necessary. This may be effected by the introduction of automatic flush tanks at the initial end of all sewers. These tanks should be connected to the water supply and designed to hold about 300 gallons each. They should be arranged to fill and discharge at stated intervals, generally once in about twenty-four hours. Experience has demonstrated, however, that unless great care and constant attention is exercised they will either fill and discharge too frequently, wasting a large amount of water, or else they will fail to discharge altogether.

The introduction of a special flush tank and manhole combined may be found more satisfactory, and will certainly use less water, by employing a responsible party to fill and discharge the same as often as each particular sewer may require flushing, generally at less frequent intervals than once a day. Supplementary flushing along some of the larger lines of sewer may be found necessary, especially in the early days of the system, previous to the time that the flow has become sufficient to create the requisite velocity. This can be accomplished by the introduction of pipe connections to the esteros at or near the various estero crossings, and also by the introduction of simple devices in certain manholes, which, when closed, will retain the sewage until a sufficient supply has accumulated to form an effective flush, when it will be released.

ESTIMATE OF COST.

The estimated cost of the entire project as outlined on the accompanying plans amounts to \$1,041,620.85 for that part of the system located on the north side of the river, and \$566,615.80 for that part of the system located on the south side of the river, or the entire cost amounting to \$1,608,236.65. The details for the cost of the proposed system may be found in the appendix accompanying this report.

CONCLUSION.

In concluding this report I desire to state that there are many details to be experienced in connection with the sewerage and plumbing work of the city that will be entirely new and foreign to an engineer who is only familiar with the customs and practices of the American people. What may be found wholly satisfactory in the States is not necessarily best for the natives of this tropical country.

While the main principles are doubtless applicable to both the East and the West, yet the details, especially along plumbing lines, will widely differ.

The prejudices and habits of this people are in many ways so totally different from the American people that it will be very necessary to make a careful study of the customs prevailing in these Islands, and also in other oriental cities where sewerage systems have been introduced and are now said to be working successfully, before committing ourselves to a system of drainage and plumbing that we may later find unsuitable for the needs of this community.

A very large per cent of the native population in Manila reside in houses built of light material, one story in height, and constructed by the occupants upon ground rented from landowners who possess large and generally unsubdivided tracts of land. The lives of these houses at best are but about five years, and their valuation generally not more than a few pesos each. In the thickly populated districts among the poorer classes these houses in the past have been built extremely close together, and often had only sufficient room for narrow passageways between. All culinary and washing arrangements, and toilet accommodations, if any exist, are extremely simple. All water for household use is carried in buckets from the nearest street hydrant (Manila at present having a very good yet totally inadequate water supply of about 8,000,000 gallons per day), and all wastes are dumped upon the ground where the liquids quickly disappear during the dry season into a very porous sandy soil. During the rainy season, however, the soil becomes saturated with water and in many places water stands at a considerable depth among the houses and aids in creating conditions which are very detrimental to the public health, due to an accumulation of filth which is augmented from year to year. In parts of this tropical city over 500 people per acre can be found living under conditions of the kind just described, and the

question that naturally suggest itself would be, Is it any wonder that we are subject to periodic attacks of cholera, bubonic plague, and possibly to other diseases equally as contagious or infectious? Manila, with its large number of inhabitants living in a more sanitary manner, would no doubt become one of the most healthful cities in the world, and would in a short time experience an enormous growth in population and increase in wealth.

House connections in any city are very costly, and would be doubly so here on account of the expense that would be incurred for plumbing material, all of which at the present time must be imported. As a consequence the plumbing for one nipa house would doubtless cost many times the value of the building and of its contents, and be quite beyond the amount which the average owner could afford to pay.

Upon the completion of this system, the owners of all premises built of strong material (which includes all structures except those built of nipa and bamboo) should be required to connect with the public sewer and water supply in accordance with certain fixed regulations governing plumbing and house draining. Only modern plumbing fixtures should be allowed, but when desired the use of the simplest types should be encouraged, particularly among the poorer classes of people, until they become more familiar with the use and care of modern conveniences.

Houses in this city constructed of nipa and bamboo will in a very short time be confined exclusively to districts located outside the fire limits.

As I have already stated, these houses are usually very simple in design, often not more than 10 feet square, of one story, and capable of being borne on the backs of a dozen men. The introduction of plumbing into houses of this kind is the problem that confronts this city, in order that the proposed sewerage system may benefit not only the well-to-do, but also that part of the population (estimated at perhaps 50 per cent) who are very poor, and who reside in the class of houses just described. It is believed that these obstacles can be overcome, however, by resorting to the use of one building which shall be constructed and cared for by the landowner in each colony or square for the purpose of affording toilet, bath, and lavatory accommodations to the lessees of his property. By this arrangement one water and sewer connection can be made to serve a large number of people, and greatly lessen the cost for plumbing work than would otherwise be possible.

The introduction of public toilet and washing accommodations—inexpensive and simple in design—in the vicinity of the more densely populated portions of the city would undoubtedly be of great use, especially during the first years of the transformation, for the purpose of educating the people and causing them to adopt more sanitary methods of living.

While all calculations for pumping machinery have been based upon the assumption that steam power would be used in the main pumping

stations and electrical power in the lift stations, yet the source of such electric power is somewhat uncertain.

Investigations which have recently been made disclose the fact that there is an abundance of undeveloped water power in the Islands sufficiently near the city to warrant its use for generating electricity which could be used to excellent advantage not only for lighting the city and operating all electric railways but also for furnishing any cheap power that might be required for public or private purposes throughout the city. Were this power to be developed by the Government in time for its use in the sewage pumping stations, there could be no question in regard to the advisability of introducing pumping machinery with a view to operating all smaller sewage pumps by electric power from a central power station. At the present time there would seem to be little or no prospect for an immediate development of this power. The street railway and lighting company is now erecting a modern power house, from which it will be prepared to furnish any electric power that may be desired either for public or private purposes.

The renting of power for the purpose of operating any sewage-pumping machinery by electricity would be extremely expensive, somewhat hazardous, and can not be recommended. The service must necessarily be continuous after once set in operation, which can hardly be guaranteed by a private corporation. A careful consideration of other kinds of motive power has been made, and the conclusion reached that it may be advisable to introduce modern gas engines, to be used in connection with suction gas producing plants in which charcoal alone will be used in the manufacture of the gas. The producer is a very simple contrivance, and it is said can be operated in an efficient and economical manner by any person of ordinary intelligence.

In case this system can be made a success, the cost of operating the smaller pumping stations by means of gas engines will unquestionably be far less than that of any other power attainable in the Philippines, and I would strongly urge that a thorough investigation of its merits be made with a view to its introduction for that purpose.

The gas engine can always be easily replaced by an electric motor in case such a change should become desirable in any pumping station.

The ground-water infiltration, which can not be entirely excluded from the sewers and which has been provided for in this design, will not be an unmixed evil for the reason that it will reduce the ground-water elevation throughout the city. This will materially aid in improving the conditions from a sanitary point of view, and at the same time have a beneficial effect in partially overcoming the mosquito nuisance which now exists to an alarming extent and which is known to be such an important factor in the transmission of certain disease germs. Aside from the ground-water infiltration the flow in a newly constructed system of sewers is always insignificant and can only be materially

augmented by requiring all abutting property holders to connect with the public sewer and water supply. To carry out such a plan would be a stupendous undertaking in any city and will be doubly so here, where the uses and advantages of plumbing accommodations are so little understood by a large majority of the inhabitants. Many years will be likely to elapse before the use of modern plumbing becomes general throughout this oriental city.

As all sewage pumping stations must necessarily be equipped to handle a much larger quantity of sewage than will be likely to reach them in the ordinary way for many years, it will become necessary for the successful and economical operation of all pumping machinery to provide an additional water supply. This can be arranged by utilizing the excess capacity in the main sewers for drawing water from near the upper end of the various esteros throughout the city. Such an arrangement will not only serve the purpose of supplying additional water for operating the sewage pumps and incidentally flushing a part of the sewerage system but also promote a circulation and purification of the water in the various esteros which during the hot, dry season becomes so foul and offensive as to be a source of constant complaint and a menace to the public health.

This arrangement will make it possible to withdraw water from the esteros which is polluted with filth to the point of saturation and to supply clean, fresh river water to take its place.

By the continuance of this suggested method of purification and by the removal of the present sources of pollution, the esteros, after being dredged, may be maintained at all times in a condition but slightly inferior to that of the river itself.

In designing sewerage plans for a city of the size of Manila, it is usually found necessary to harmonize and make use of existing lines of sewers as far as possible, in order to lessen the cost. In this city which has already grown to metropolitan proportions, and when its future lines of growth can be predicted with almost a mathematical certainty, it has been possible to outline a sewerage system as a completed whole with all its parts new and in perfect harmony and proportion to the completed structure. It is believed that the sewerage system recommended for Manila, if properly installed, will be as complete and up-to-date as that of any other city in the world, and will mark the beginning of a transformation which will make this city one of the most healthful and at the same time place it among the most important in the Orient.

In concluding this report I wish to express my appreciation of the valuable assistance rendered me by Mr. A. F. Armstrong, C. E., and Mr. C. E. Beugler, who have been my chief assistants in the prosecution of this work.

Very respectfully,

O. L. INGALLS,

Engineer in Charge of Manila Sewerage System.

The MUNICIPAL BOARD, Manila, P. I.

APPENDIX A.—*Sewerage system, detailed estimates.*

NORTH SIDE OF RIVER.

MAIN INTERCEPTING SEWER ALONG CALLE AZCARRAGA FROM THE BAY
TO THE ROTUNDA.

5-foot brick sewer, 600 feet, at \$25.....	\$15,000.00
4.75-foot brick sewer, 990 feet, at \$21.....	20,790.00
4.50-foot brick sewer, 2,220 feet, at \$16.50.....	36,630.00
4.25-foot brick sewer, 1,780 feet, at \$15.....	26,700.00
3.75-foot brick sewer, 3,400 feet, at \$13.50.....	45,900.00
2.75 by 4.12 foot brick sewer, 720 feet, at \$13.50.....	9,720.00
2.50 by 3.75 foot brick sewer, 1,310 feet, at \$12.50.....	16,375.00
2.25 by 3.37 foot brick sewer, 1,170 feet, at \$11.50.....	13,455.00
6-inch standpipe, 2,500 feet, at \$0.40.....	1,000.00
36-inch cast-iron pipe, 690 feet, at \$16.....	11,040.00
Manholes, 34, at \$60.....	2,040.00
Total	198,650.00
Ten per cent for contingencies.....	19,865.00
Aggregate	218,515.00

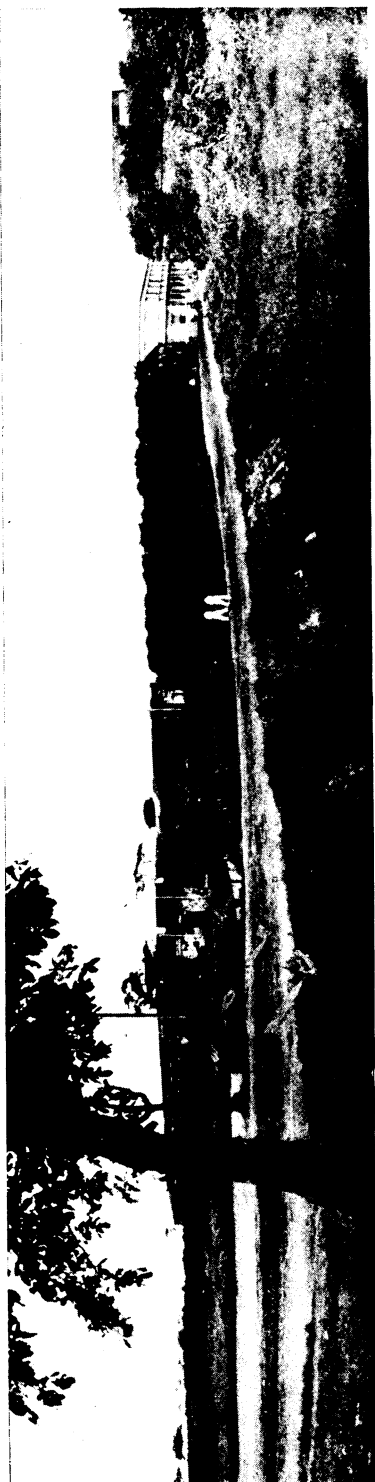
DISTRICT SEWERS.

San Nicolas:

8-inch pipe sewer, 24,160 feet, at \$1.30.....	31,408.00
10-inch pipe sewer, 1,950 feet, at \$2.55.....	4,972.50
12-inch pipe sewer, 1,300 feet, at \$3.30.....	4,290.00
15-inch pipe sewer, 600 feet, at \$3.75.....	2,250.00
18-inch pipe sewer, 800 feet, at \$4.90.....	3,920.00
21-inch pipe sewer, 1,350 feet, at \$6.35.....	8,572.50
24-inch pipe sewer, 2,310 feet, at \$7.75.....	17,902.50
6-inch standpipe, 1,920 feet, at \$0.40.....	768.00
20-inch cast-iron pipe, 90 feet, at \$15.....	1,350.00
Flushing tanks, 42, at \$100.....	4,200.00
Manholes, 99, at \$60.....	5,940.00
Total	85,573.50
Ten per cent for contingencies.....	8,557.35
Aggregate	94,130.85

Tondo:

8-inch pipe sewer, 17,600 feet, at \$1.30.....	22,880.00
10-inch pipe sewer, 3,230 feet, at \$2.55.....	8,236.50
2 by 3 foot brick sewer, 2,750 feet, at \$10.50.....	28,875.00
2.25 by 3.37 foot brick sewer, 1,600 feet, at \$11.25.....	18,000.00
6-inch standpipe, 1,500 feet, at \$0.40.....	6,000.00
Flushing tanks, 31, at \$100.....	3,100.00
Manholes, 40, at \$60.....	2,400.00
Total	89,491.50
Ten per cent for contingencies.....	8,949.15
Aggregate	98,440.65



PALACIO STREET EXTENSION, SHOWING OLD AND NEW GATEWAYS IN OLD WALL. NEW GATEWAY PROVIDING AND EXIT FOR THE NEW ELECTRIC RAILWAY.



ADUANA STREET EXTENSION, COMPLETED. NEW OPENING IN THE WALL CONNECTING INTRAMUROS WITH THE MALECON.

NORTH SIDE OF RIVER—Continued.

DISTRICT SEWERS—continued.

Santa Cruz (including that part of Quiapo west of Estero de Quiapo):

8-inch pipe sewer, 25,680 feet, at \$1.30.....	\$33,384.00
10-inch pipe sewer, 1,870 feet, at \$2.55.....	4,768.50
12-inch pipe sewer, 280 feet, at \$3	840.00
15-inch pipe sewer, 2,030 feet, at \$3.75.....	7,612.50
18-inch pipe sewer, 1,080 feet, at \$4.90.....	5,292.00
21-inch pipe sewer, 1,400 feet, at \$6.35.....	8,890.00
2 by 3 foot brick sewer, 2,320 feet, at \$10.50.....	24,360.00
2.25 by 3.37 foot brick sewer, 1,800 feet, at \$11.50.....	20,700.00
6-inch standpipe, 2,600 feet, at \$0.40.....	1,040.00
Flushing tanks, 54, at \$100.....	5,400.00
Manholes, 77, at \$60.....	4,620.00

Total	116,907.00
Ten per cent for contingencies.....	11,690.70

Aggregate	128,597.70
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Binondo:

8-inch sewer pipe, 20,500 feet, at \$1.30.....	26,650.00
10-inch sewer pipe, 2,560 feet, at \$2.55.....	6,528.00
12-inch sewer pipe, 800 feet, at \$3.....	2,400.00
15-inch sewer pipe, 110 feet, at \$3.75.....	412.50
18-inch sewer pipe, 120 feet, at \$4.90.....	588.00
16-inch cast-iron pipe, 95 feet, at \$10.....	950.00
6-inch standpipe, 900 feet, at \$0.40.....	360.00
Flushing tanks, 42, at \$100.....	4,200.00
Manholes, 60, at \$40.....	2,400.00

Total	44,488.50
Ten per cent for contingencies.....	4,448.85

Aggregate	48,937.35
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San Miguel:

8-inch pipe sewer, 6,670 feet, at \$1.30.....	8,671.00
10-inch pipe sewer, 1,010 feet, at \$2.55.....	2,575.50
12-inch pipe sewer, 950 feet, at \$3.....	2,850.00
15-inch pipe sewer, 1,050 feet, at \$3.75.....	3,937.50
18-inch pipe sewer, 260 feet, at \$4.90.....	1,274.00
6-inch standpipe, 720 feet, at \$0.40.....	288.00
Flushing tanks, 9, at \$100.....	900.00
Manholes, 25, at \$40.....	1,000.00

Total	21,496.00
Ten per cent for contingencies.....	2,149.60

Aggregate	23,645.60
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NORTH SIDE OF RIVER—Continued.

DISTRICT SEWERS—continued.

Quiapo:

8-inch pipe sewer, 6,300 feet, at \$1.30.....	\$8,190.00
10-inch pipe sewer, 1,740 feet, at \$2.55.....	4,437.00
15-inch pipe sewer, 340 feet, at \$3.75.....	1,275.00
18-inch pipe sewer, 1,130 feet, at \$4.90.....	5,537.00
21-inch pipe sewer, 970 feet, at \$6.35.....	6,159.50
2 by 3 main sewer, 550 feet, at \$10.50.....	5,775.00
6-inch standpipe, 1,150 feet, at \$0.40.....	460.00
Flushing tanks, 11, at \$100.....	1,100.00
Manholes, 22, at \$60.....	1,320.00

Total	34,253.50
Ten per cent for contingencies.....	3,425.35

Aggregate	37,678.85
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Sampaloc:

8-inch pipe sewer, 7,370 feet, at \$1.30.....	9,581.00
12-inch pipe sewer, 950 feet, at \$3.....	2,850.00
15-inch pipe sewer, 710 feet, at \$3.75.....	2,662.50
18-inch pipe sewer, 2,280 feet, at \$4.90.....	11,172.00
2 by 3 main sewer, 1,000 feet, at \$10.50.....	10,500.00
6-inch standpipe, 870 feet, at \$0.40.....	348.00
Flushing tanks, 14, at \$100.....	1,400.00
Manholes, 40, at \$60.....	2,400.00

Total	40,913.50
Ten per cent for contingencies.....	4,091.35

Aggregate	45,004.85
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OUTFALL SEWER.

5,000 linear feet 36-inch pipe, 1,140 tons, at \$30.....	\$34,200.00
Foundations and laying 5,000 feet 36-inch pipe, at \$10.....	50,000.00
Dredging channel for pipe.....	5,000.00
Construction of protection to outlet.....	2,000.00

Total	91,200.00
Ten per cent for contingencies.....	9,120.00

Aggregate	100,320.00
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MAIN PUMPING STATION.

Cost of ground for erection of building.....	\$8,000.00
2 16,000.000-gallon pumps, at \$28,000.....	56,000.00
3 60-horsepower boilers, at \$25 per horsepower.....	4,500.00
Cost of excavations for pump wells, gates, cage chambers, etc., including lining of same and preparation of all foundations.....	25,000.00
Engine and boiler house above foundations.....	20,000.00
Special castings, valves, screens, etc.....	10,000.00

Total	123,500.00
Ten per cent for contingencies.....	12,350.00

Aggregate	135,850.00
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NORTH SIDE OF RIVER—Continued.

LIFT STATION, CALLE ARRANQUE.

Purchase of lease for ground for station.....	\$3,000.00
2 motors, connections, and pumps, at \$5,000.....	10,000.00
Building above foundations.....	6,000.00
Excavation from pump wells, gates, etc., including cost of lining.....	5,000.00
Special castings, etc.....	4,000.00
Total	28,000.00
Ten per cent for contingencies.....	2,800.00
Aggregate	30,800.00

LIFT STATION, PLAZA DE SANTA ANA.

Ground for station.....	\$7,000.00
2 motors, connections, and pumps, at \$3,500.....	7,000.00
Building above foundations.....	5,000.00
Excavation for pump wells, gates, etc., including cost of lining.....	5,000.00
Special castings, etc.....	3,000.00
Total	27,000.00
Ten per cent for contingencies.....	2,700.00
Aggregate	29,700.00

SOUTH OF RIVER.

MAIN SEWER, CALLE HERRAN FROM BAY TO CALLE PEÑAFRANCIA.

4-foot brick sewer, 420 feet, at \$18.....	\$7,560.00
2.50 by 3.75 foot brick sewer, 2,060 feet, at \$13.....	26,780.00
2.25 by 3.37 foot brick sewer, 1,860 feet, at \$11.50.....	21,390.00
2 by 3 foot brick sewer, 1,420 feet, at \$10.50.....	14,910.00
6-inch standpipe, 1,250 feet, at \$0.40.....	500.00
Manholes, 18, at \$60.....	1,080.00
Total	72,220.00
Ten per cent for contingencies.....	7,222.00
Aggregate	79,442.00

INTRAMUROS.

8-inch pipe sewer, 17,900 feet, at \$1.30.....	\$23,270.00
10-inch pipe sewer, 820 feet, at \$2.55.....	2,091.00
15-inch pipe sewer, 1,080 feet, at \$3.75.....	4,050.00
18-inch pipe sewer, 820 feet, at \$4.90.....	4,018.00
24-inch pipe sewer, 840 feet, at \$7.75.....	6,510.00
27-inch brick sewer, 1,930 feet, at \$11.50.....	22,195.00
6-inch standpipe, 2,200 feet, at \$0.40.....	880.00
Flushing tanks, 42, at \$100.....	4,200.00
Manholes, 99, at \$60.....	5,940.00
Total	73,154.00
Ten per cent for contingencies.....	7,315.40
Aggregate	80,469.40

SOUTH OF RIVER—Continued.

ERMITA.

8-inch pipe sewer, 30,460 feet, at \$1.30.....	\$39,598.00
10-inch pipe sewer, 3,380 feet, at \$2.55.....	8,619.00
12-inch pipe sewer, 2,640 feet, at \$3.....	7,920.00
15-inch pipe sewer, 2,400 feet, at \$4.25.....	10,200.00
18-inch pipe sewer, 1,880 feet, at \$4.90.....	9,212.00
21-inch pipe sewer, 440 feet, at \$7.25.....	3,190.00
2.75-foot brick sewer, 2,890 feet, at \$11.50.....	33,235.00
3-foot brick sewer, 1,420 feet, at \$14.....	19,880.00
6-inch standpipe, 4,200 feet, at \$0.40.....	1,680.00
Flushing tanks, 46, at \$100.....	4,600.00
Manholes, 125, at \$60.....	7,500.00
Total	145,634.00
Ten per cent for contingencies.....	14,563.40
Aggregate	160,197.40

MALATE.

8-inch pipe sewer, 6,310 feet, at \$1.30.....	\$8,203.00
10-inch pipe sewer, 1,200 feet, at \$2.55.....	3,060.00
12-inch pipe sewer, 1,550 feet, at \$3.....	4,650.00
15-inch pipe sewer, 600 feet, at \$3.75.....	2,250.00
18-inch pipe sewer, 1,120 feet, at \$4.90.....	5,488.00
21-inch pipe sewer, 700 feet, at \$6.35.....	4,445.00
6-inch standpipe, 1,400 feet, at \$0.40.....	560.00
Flushing tanks, 10, at \$100.....	1,000.00
Manholes, 25, at \$60.....	1,500.00
Total	31,156.00
Ten per cent for contingencies.....	3,115.60
Aggregate	34,271.60

PACO.

8-inch pipe sewer, 4,970 feet, at \$1.30.....	\$6,461.00
10-inch pipe sewer, 460 feet, at \$2.55.....	1,173.00
12-inch pipe sewer, 460 feet, at \$3.....	1,380.00
21-inch pipe sewer, 4,000 feet, at \$6.35.....	25,400.00
6-inch standpipe, 1,000 feet, at \$0.40.....	400.00
Flushing tanks, 10, at \$100.....	1,000.00
Manholes, 30, at \$60.....	1,800.00
Total	37,614.00
Ten per cent for contingencies.....	3,761.40
Aggregate	41,375.40

SOUTH OF RIVER—Continued.

OUTFALL SEWER.

2,500 linear feet 24-inch cast-iron pipe, 290 tons, at \$30.....	\$8,700.00
Foundation and laying 2,500 linear feet cast-iron pipe, at \$10.....	25,000.00
Dredging channel for 2,500 feet pipe.....	2,500.00
Construction of protection to outlet.....	2,000.00
Total	38,200.00
Ten per cent for contingencies.....	3,820.00
Aggregate	42,020.00

MAIN PUMPING STATION.

2 7,000,000-gallon pumps and engines, at \$12,000.....	\$24,000.00
2 boilers, 40-horsepower, at \$30.....	2,400.00
Cost of excavations for gates, pump wells, cage chambers, etc., including lining of same and preparation of all foundations.....	25,000.00
Engine and boiler house above foundation.....	20,000.00
Special castings, valves, screens, etc.....	8,000.00
Total	79,400.00
Ten per cent for contingencies.....	7,940.00
Aggregate	87,340.00

LIFT STATION, CALLE HERRAN, NEAR ESTERO DE PACO.

Ground for station.....	\$5,000.00
1 motor and pump.....	2,000.00
Buildings, foundations, pump wells, etc.....	3,000.00
Total	10,000.00
Ten per cent for contingencies.....	1,000.00
Aggregate	11,000.00

LIFT STATION, CALZADA DE VIDAL AND CALLE NOZALED.

1 motor and pump.....	\$2,000.00
Buildings, foundations, pump well, etc.....	3,000.00
Total	5,000.00
Ten per cent for contingencies.....	500.00
Aggregate	5,500.00

SUMMARY OF COST OF WORK ON NORTH SIDE OF RIVER.

Main intercepting sewer, Calle Azcarraga and Calle Alix from bay to Rotunda.....	\$218,515.00
San Nicolas District.....	94,130.85
Tondo District	98,440.65

SUMMARY OF COST OF WORK ON NORTH SIDE OF RIVER—Continued.

Santa Cruz (including part of Quiapo west of Estero de Quiapo)	\$128,597.70
Binondo District	48,937.35
San Miguel District.....	23,645.60
Quiapo District, not already included.....	37,678.85
Sampaloc District.....	45,004.85
Outfall sewer	100,320.00
Main pumping station, north side of river.....	135,850.00
Lift pumping station, Calle Arranque.....	30,800.00
Lift pumping station, Plaza de Santa Ana.....	29,700.00
Contingencies not otherwise provided for.....	50,000.00
Total	1,041,620.85

SUMMARY OF COST OF WORK ON SOUTH SIDE OF RIVER.

Main intercepting sewer on Calle Herran, from bay to Calle Peñafrancia	\$79,442.00
Intramuros District	80,469.40
Ermita District	160,197.40
Malate District	34,271.60
Paco District	41,375.40
Outfall sewer, south side of river.....	42,020.00
Main pumping station, south side of river.....	87,340.00
Lift pumping station, Calle Herran, near Estero de Paco.....	11,000.00
Lift pumping station, Calzada de Vidal.....	5,500.00
Contingencies not otherwise provided for.....	25,000.00
Total	566,615.80
Total for work on north side of river.....	1,041,620.85
Grand total	1,608,236.65

Velocity and discharge of sewers, 8-inch to 5-foot diameter.

[Value of μ —0.013 Kutter formula. Springing line depths used in computing R. for all sized sewers.]

Size.	Slope.	Per cent full.	Velocity, feet per second.	Discharge, cubic feet per second.	Slope of 1:1,200.	
					Velocity, feet per second.	Discharge, cubic feet per second.
8 inch	1:250	50	2	0.35		
10 inch	1:350	50	2.07	.56		
12 inch	1:425	50	2.09	.82		
15 inch	1:550	50	2.17	1.32		
18 inch	1:700	50	2.20	1.94		
21 inch	1:875	60	2.20	3.12		
24 inch	1:1,000	70	2.26	4.27		
2.25 foot	1:1,000	70	2.46	6.8		
2.75 foot	1:1,000	70	2.84	11.8	2.59	10.77
3 foot	1:1,000	70	3.02	14.9	2.75	13.61
3.50 foot	1:1,000	70	3.36	22.6	3.06	20.59
3.75 foot	1:1,000	70	3.51	27.1	3.21	24.81

Velocity and discharge of sewers, 8-inch to 5-foot diameter—Continued.

Size.	Slope.	Per cent full.	Velocity, feet per second.	Discharge, cubic feet per second.	Slope of 1:1,200.	
					Velocity, feet per second.	Discharge, cubic feet per second.
4 foot	1:1,000	70	3.68	32.4	3.36	29.57
4.25 foot	1:1,000	70	3.83	38	3.50	34.75
4.50 foot	1:1,000	70	3.98	44.3	3.69	40.51
4.75 foot	1:1,000	70	4.14	51.3	3.77	46.77
5 foot	1:1,000	70	4.20	58.8	3.90	53.60
2 by 3 foot	1:1,000	70	2.67	8.33	2.44	7.65
2.25 by 3.37 foot	1:1,000	70	2.91	11.69	2.65	10.65
2.50 by 3.75 foot	1:1,000	70	3.13	15.64	2.85	14.24
2.75 by 4.12 foot	1:1,000	70	3.35	20.38	3.05	18.55

Sizes and lengths of sewers, by districts.

Sizes.	Main sewer, Azcapotzalco.	San Nicolas.	Tondo.	Santa Cruz.	Bi-nondo.	San Miguel.	Quiapo.	Sam-paloc.
8 inch		24,160	19,150	31,490	20,700	6,100	6,000	8,100
10 inch		1,950	3,230	3,270	2,690	1,010	2,000	260
12 inch		1,300	700		790	950		
15 inch		600	580	2,760	110	1,050	340	
18 inch		800		680		260	1,130	3,220
21 inch		1,350		1,460			970	130
24 inch		2,310					570	
3.50 foot	2,850							
3.75 foot	680							
4.25 foot	1,780							
4.50 foot	2,220							
4.75 foot	990							
5 foot	600							
2 by 3 foot			2,750	2,320				
2.25 by 3.37 foot	1,170		1,530	1,800				
2.50 by 3.75 foot	1,310							
2.75 by 4.12 foot	720							
Total	12,320	32,470	27,940	43,780	29,290	9,370	11,010	11,740

Sizes.	Intramuros.	Ermita.	Malate.	Paco.	Main sewer, Herran.	Total feet.	Total miles.
8 inch	22,100	30,460	4,500	7,710		180,500	34.19
10 inch	820	3,380	2,360			20,970	3.97
12 inch		2,640		950		7,330	1.39
15 inch	1,080	2,400				8,920	1.69
18 inch	820	1,880	1,870			10,660	2.02
21 inch		440		2,000		6,350	1.20
24 inch	840					4,390	.70
2.25 foot	1,930					1,930	.36
2.75 foot		2,890				2,890	.55
3 foot		1,420				1,420	.27
3.50 foot						2,850	.54
3.75 foot						680	.13
4 foot					420	420	.08
4.25 foot						1,780	.34
4.50 foot						2,220	.42
4.75 foot						990	.19
5 foot						660	.11
2 by 3 foot					1,420	6,490	1.23
2.25 by 3.37 foot					1,860	6,360	1.20
2.50 by 3.75 foot					2,060	3,370	.64
2.75 by 4.12 foot						720	.14
Total	27,590	45,510	8,730	10,660	5,760	271,170	51.36

Present and estimated future population, by districts, and maximum flow of sewage in cubic feet per second per acre.

District.	Area in acres.	Present popula- tion.	Estimat- ed future popula- tion.	Estimat- ed future popula- tion per acre.	House drain- age. ¹	Infiltra- tion. ¹	Total flow. ¹
North of Pasig River:							
San Nicolas.....	130	29,441	46,800	360	0.067	0.003	0.070
Tondo.....	{ 190 } 110 140	40,438	{ 38,000 8,250 7,000	200 75 50	.037 .014 .009	.003 .003 .003	.040 .017 .012
North of Tondo.....			20,000				
Santa Cruz.....	{ 121 } 169	34,926	{ 24,200 25,350	200 150	.037 .028	.003 .003	.040 .031
North of Santa Cruz.....			20,000				
Sampaloc.....	366	19,124	36,600	100	.019	.003	.022
North of Sampaloc.....			30,000				
San Miguel.....	{ 74 } 132 47	8,896	{ 9,250 6,600 7,050	125 50 150	.023 .009 .028	.003 .003 .003	.026 .012 .031
Binondo.....	{ 99 } 24	16,764	{ 19,800 4,800	200 200	.037 .037	.003 .003	.040 .040
Quiapo.....	{ 120 } 120	11,300	{ 15,000	125	.023	.003	.026
South of Pasig River:							
Intramuros.....	146	11,540	21,900	150	.028	.003	.031
Ermita.....	{ 63 } 366	13,145	{ 9,450 27,450	150	.028	.003	.031
Paco.....	89	6,352	6,676	75	.014	.003	.017
East of Paco.....			30,000	75	.014	.003	.017
Santa Ana.....		3,223					
Pandacan.....		2,988					
Malate.....	{ 250 } 84	8,547	18,750	75	{ .014 .019	.003 .003	.017 .022
People living afloat.....		16,339	8,400	100			
Total.....		223,029	441,325				

¹ Cubic feet per second per acre.

REPORT OF MR. DESMOND FITZGERALD UPON THE PROPOSED SEWER SYSTEM.

MANILA, *May 12, 1904.*

SIR: I have the honor to present herewith my report as Consulting Engineer upon the proposed system of sewerage for the city of Manila:

EXISTING CONDITIONS.

There is at present no comprehensive system of sewerage in Manila. The nearest approach to any method worthy of being called a system is that which provides for the daily removal of about 1,500 pails which are emptied into the bay at a distance of about 10 miles from the shore; but however excellent or effective this work may be, it can be viewed only as a temporary expedient.

A large part of the water-closet and other domestic drainage is discharged into cesspools, surface-water channels, or old sewers and finds its way into the esteros of the river or is absorbed into the soil.

In many parts of the city human wastes are collected and stored in masonry vaults, built above ground and often two stories in height, which are broken into at long intervals and the contents removed. In many portions of the native settlements, discharges take place upon the surface of the ground, sometimes into shallow pools surrounded by miniature embankments where the contents are subjected to septic action, and sometimes upon the bare ground without any attempt to interfere with that beneficent domestic scavenger the hog.

Many of the poorer quarters are entirely unprovided with any sanitary facilities, and here it is not an uncommon practice for the feces to be wrapped in newspaper or other covering and thrown into the street when the garbage wagons pass. Fortunately the street cleaning department is one of the most efficient in the city. The surface of the streets are kept uniformly sweet and clean even in the most remote suburbs.

It requires no argument to prove that the city, as far as its sewerage is concerned, is in a very unsanitary condition and one which invites epidemics.

On February 1, 1904, Mr. O. L. Ingalls, C. E., submitted a report to your Board, outlining a system of sewage disposal, and it is upon

this report that I have been requested to submit my views as Consulting Engineer.

The plan is based upon the separate system, so called, which is in very common use and is growing in favor with sanitary experts, particularly where it becomes necessary to dispose of the sewage by pumping. The separate system is one which separates the domestic and manufacturing wastes from the rain water and disposes of them by separate sewers. As the domestic and manufacturing wastes are comparatively uniform in quantity from day to day, depending largely upon the consumption of water, the sewers built to collect these wastes may generally be much smaller than those which carry the rain water and which must be large enough to dispose of heavy rainstorms, however infrequent they may be. Storm water may also be discharged into water courses where it would be very inappropriate or dangerous to discharge domestic sewage.

Mr. Ingalls has described the leading methods of treating sewage dependent upon the situation and conditions connected with different cities, and it is unnecessary for me to dwell upon them. In brief, it may be said that there is no choice for Manila, the advantages of a position upon a large body of salt water pointing decidedly to the opportunity for disposing of the sewage by discharging it well out from the shore, and the peculiar topography of the city pointing unmistakably to the choice of the separate system for collection.

There are now so many cities where large quantities of sewage are discharged into water that the results are no longer of an experimental nature. We know, for instance, that the sewage rises and spreads in a thin layer over the surface of the water, covering a very large area and drifting with the currents. Careful analyses of sewage streams in Boston Harbor¹ showed that at 400 feet—

* * * from the outlet of the sewer the upper 8 inches in depth was about one-half sewage, at 1,600 feet distant it contained about one-eighteenth of its bulk of sewage, and at 3,200 feet, or five-eighths of a mile distant from the outlet of the sewer, the ammonias indicated the amount of sewage added to be but 1 per cent of the volume of the water * * * and less than one-tenth of 1 per cent at 1½ miles from the outlet.

While I fully believe that with a careful selection of an outlet or outlets for the sewage into Manila Bay in front of the city there will be no disagreeable results, especially for a number of years, yet I think we should not lose sight of the fact that it takes some little time for the sewage to be consumed and that it is important to select such a position for the discharge as will lead to a rapid dispersion of the sewage and away from the city or from beaches where its presence would be undesirable. By this method the sewage is rapidly and

¹ Report of Massachusetts State board of health, 1889, page 33.

effectually consumed with no accumulation of offensive organic matter, but this result depends upon very extensive dilution and free exposure to the air.

OUTLINES OF MR. INGALLS'S PLAN.

Mr. Ingalls's plan for disposing of the sewage of Manila may be outlined as follows: The sewers start at their upper ends with a minimum depth of 5 feet below the surface and descend until they reach a level so far below the surface that it becomes advisable in the interest of economy to raise the sewage by pumping.

This operation is repeated as often as is necessary, forming a series of steps, until finally the sewage is all collected at a main pumping station on the shores of the bay. Here the sewage is raised and discharged through cast-iron pipes laid below the level of the bottom of the bay and extending out half a mile or more into the harbor, where the outlet is to be placed. There are two main pumping stations, one for that portion of the city lying north of the Pasig River and the other for that portion of the city lying south of the river; the former to be placed on the Paseo de Azcarraga, not far from the mouth of the river, and is to discharge the sewage into the harbor at a point well beyond the lighthouse and nearly in line with the river as it debouches into the harbor; the other main pumping station, to serve for the southern section of the city, is located at the terminus of Calle Herran and the sewage is to be discharged straight out from the shore at a distance of about half a mile.

Besides the two main pumping stations there are two supplementary pumping stations on each side of the river to raise the sewage on its way to the main stations. The sewers are planned for an increase in the population from 223,029 to 441,325.

As the outlets for the final disposition of the sewage are among the most important features of the proposed system, and the design and routes of the sewers and the positions of the main pumping stations are dependent upon them, I will take up first the subject of the outlets.

OUTLETS.

The main outlet selected—viz, that on the north side of the river and which will dispose of about four-fifths of the present sewage of the whole city—has, I believe, been well chosen, although it may be found desirable to extend the point of outlet farther from the shore. The discharge of the large amount of fresh water carried by the Pasig into the bay will tend to disperse the sewage with a resultant in the direction desired “off shore.” Winds which may carry the currents and sewage toward the southeast will encounter the long line of breakwater on the south side of the city, which will act as a safeguard to the beaches on the southerly side of the city and which it is desirable to protect in their

present condition as far as practicable. The winds from the southwest will blow the sewage toward the shore in the direction of the Vitas Channel, but this portion of the water front is comparatively unoccupied and will probably remain so for many years, and the presence of the diluted sewage I believe will, at this point, prove less offensive than at any other part of the city front.

The second outlet in Mr. Ingall's plan, in line with Calle Herran, should, according to my views, be omitted and the sewage all collected at the main pumping station on the northerly bank of the river, the whole flow to be discharged into the harbor nearly a mile westerly from the light-house, which I believe to be the most favorable position practically obtainable.

As so much depends upon the float observations and their interpretation, I have devoted an unusual amount of time and attention to this branch of the investigations. Under this head Mr. Ingalls in his report says:

A few observations were taken during the month of August last and have been continued, although with some interruption, during the months of December and January, and should be continued if possible throughout one entire year for the purpose of ascertaining what changes, if any, take place in the direction and velocities of the currents in Manila Bay during the varying stages of the tides and the different directions and intensities of the wind. All observations taken up to this time disclose the fact that the water in all parts of the bay has a perceptible velocity varying from a small amount to 1,500 feet or more per hour. It has also been ascertained that the velocities of the currents are invariably greatest near the surface of the water.

While the direction and intensity of the wind undoubtedly govern to a large extent the movements of the water in all parts of the bay, yet the direction of the currents seems to be largely influenced by other conditions. This was particularly true of all observations taken off Ermita shore, where the floats generally took a southerly direction irrespective of the direction of the wind.

The observations taken in August, referred to above, were generally considered unreliable and the notes were lost or destroyed. The next observations were made on November 9 and November 12, and are marked "uncertain." Between November 23 and December 11 float observations were made to the south of the river on eight days, and a careful examination of the original notes shows that during these observations the floats in a general way followed the direction of the wind and that the wind was quite generally from the northwest, the north-northwest, or west-northwest. In a few cases the floats went in a northerly direction when there was no wind which would cause the currents to go in that direction.

The next float observations on the southerly side of the river were made during four days in January, viz, January 7, 8, 9, and 28, but I can not find in them proof of the existence of a southerly current except one due to the direction of the wind.

No float observations were made during the month of February. On March 16, 17, and 28 float observations were made on the southerly side of the river, but these observations are not indicative of the existence of a southerly current. On March 28 the floats took a rapid northwesterly course until stopped by obstructions.

As a careful study of the float observations leads to the conclusion that the distribution of the winds in Manila Bay are largely responsible for the source of the currents,¹ an examination of the prevailing winds becomes necessary in order to form a correct judgment of the possible direction which the sewage will take when it spreads out upon the surface in a thin, greasy layer, as it always does. Fortunately, the admirable treatise on the winds prepared by the Observatory officials leaves nothing to be desired in the way of thoroughly prepared tables and diagrams upon this important question.

The following information is taken from the report of the Philippine Commission (vol. 4, Paper No. 21), prepared at the Observatory of Manila:

The prevailing wind in Manila is from the southwest from May until October—that is to say, for about six months. From November to January north winds prevail, and during the other three months—February, March, and April—the easterly winds prevail. The same frequency of the north and northwest winds occurs in February and October, and that of the south and south-southeast winds in the months of November, December, and January * * *.

Accordingly it can be said that in the months of January, February, and April the east and southeast winds prevail, both inclusive. * * *

May is the month of the veering of the winds from east to those of southwest, and that of October is the month wherein they change from southwest to those of the north.

The resultant directions for each of the twelve months in the year * * * follow:

Month.	Resultant.	Month.	Resultant.
	° /		° /
January -----	N. 41 07 E.	July -----	S. 34 28 W.
February -----	N. 83 13 E.	August -----	S. 40 48 W.
March -----	S. 84 18 E.	September -----	S. 39 41 W.
April -----	S. 63 31 E.	October -----	S. 75 32 E.
May -----	S. 16 55 E.	November -----	N. 27 45 E.
June -----	S. 0 41 E.	December -----	N. 24 13 E.

Under the head of annual frequency of the winds in Manila the officials state:

These facts show that the most prevailing winds during the year are those from the southwest, followed by those from the east.

The annual medium or resultant direction for the year is S. 58° 42' E., and the medium semiannual direction, June to October, S. 32° 41' W.; November to May N. 70° 30' E.

¹ Subsequent float observations taken since this report was written confirm this view.

From a careful consideration of the prevailing winds in the different seasons of the year, taken in connection with such of the float observations as are reliable, I am of the opinion that during at least one-half of the year the indications are that sewage discharged at any point off shore on the southerly side of the river will find its way into the confined space surrounded by the present breakwaters and those to be built, and during the other half of the year it will be carried toward the beaches.

In order that a proper conception may be formed in regard to what a stream of sewage discharging into a body of salt water really is, it may be instructive to consider the effect of sewage discharges into Boston Harbor, where a concentrated system of sewage discharges has been maintained for many years.

Sewage is now discharged into Boston Harbor in large quantities at two principal points. At Moon Island the main drainage works have discharged for about twenty years a maximum of about 100,000,000 gallons daily. In 1899 the average daily discharge was 77,000,000 gallons. It has been found as the result of much observation that the sewage remains ¹—

* * * close to the surface of the water, which is covered for a time with a greasy film. This film appears to be very thin, and it sometimes extends considerably beyond the area otherwise affected by the sewage. It is apparently composed of grease or oil from the sewage, and it is most noticeable on calm days, being quickly broken up by the waves.

So persistently does the sewage remain at the surface until it disappears that ²—

* * * it was decided in the investigations made in 1899 to use much shorter floats than those used in previous investigations. The length of most of the floats was about 8 inches, and of the remainder 2 feet.

The other principal outlet is near Deer Island, where something over 50,000,000 gallons are discharged daily. This quantity ³—

* * * while distinctly visible along the northerly edge of the channel for half a mile toward the city on the incoming tide and toward the sea on the outgoing tide, gradually becomes less distinct at greater distances from the outlet, and disappears entirely within a distance of 1½ miles.

The South Metropolitan works, which are now nearing completion, provided for the discharge of 300,000,000 gallons daily in 1940, making altogether about 5,000,000,000 gallons of daily discharge planned for the future.

¹ Discharge of sewage into Boston Harbor. Report of the State board of health, 1900, page 70.

² Ibid, p. 73.

³ Ibid, p. 5.

In 1888 an experiment was made in Boston Harbor the result of which may be best given by an abstract from a report of the State board of health, 1899:¹

That we might make observations and reach just conclusions in regard to a stream of sewage discharging continuously, the officers in charge of the Boston main drainage works kindly coöperated with the board by discharging continuously upon a falling tide, for four hours, about 1,500,000 gallons per hour, the equivalent of 36,000,000 gallons per day, which is the amount estimated to be discharged at Deer Island outlet when the population is between 300,000 and 400,000.

When sailing in the stream of sewage, or on the leeward side of it, from near the outlet of the sewer and for a distance of half a mile along the stream, the odor of the sewage was disagreeable. Continuing in the stream of sewage beyond this distance the odor was noticeable for a time, but before reaching the distance of three-quarters of a mile from the outlet of the sewer the odor could not be distinguished. At this distance, however, the color of the water was distinctly different from the blue of the sea water—it was more opaque and browner. But there was nothing at this distance, with wind blowing upstream toward the outlet of sewer, either in appearance or odor that was in the least objectionable * * *.

By the color and stillness of the surface the area containing sewage could be distinguished for a quarter of a mile farther, or at a distance of 1 mile from the outlet, but no odor could be distinguished, and there was no disagreeable appearance.

At 1 mile and a quarter a narrow strip of smooth water and a slightly opaque character of the water—seen only upon very careful examination—indicated an effect from sewage; but at 1½ miles from the outlet no trace of the sewage could be seen, although floats which started with the sewage had gone far beyond.

From a consideration of the float observations made during a portion of the year, the influence of the winds upon the surface and other currents, and the general character of the shores, I am led to the conclusion that none of the sewage of the city of Manila should be discharged into the bay south of the river unless carried to such a distance in a southerly direction and away from the breakwaters as to be practically prohibitive. Such discharges as are proposed on the line of Calle Herran I believe will be found objectionable. It is probable that the city will, before many years, appreciate the unusual beauty of the beaches with their westerly outlook sufficiently to create a driveway worthy of the situation, fronting directly upon the bay, at least for the greater part of its length. There are many other reasons which occur to me why the beaches from the Luneta southerly for a long distance should be preserved as nearly as possible in their original purity, and if no urgent necessity exists for the discharge of sewage in this direction it should be avoided, and that no urgent necessity exists is apparent from the ease with which all of the sewage may be collected at the main pumping station near the outlet of the river.

¹ Discharge of sewage into Boston Harbor. Report of the State board of health, 1900, page 22.

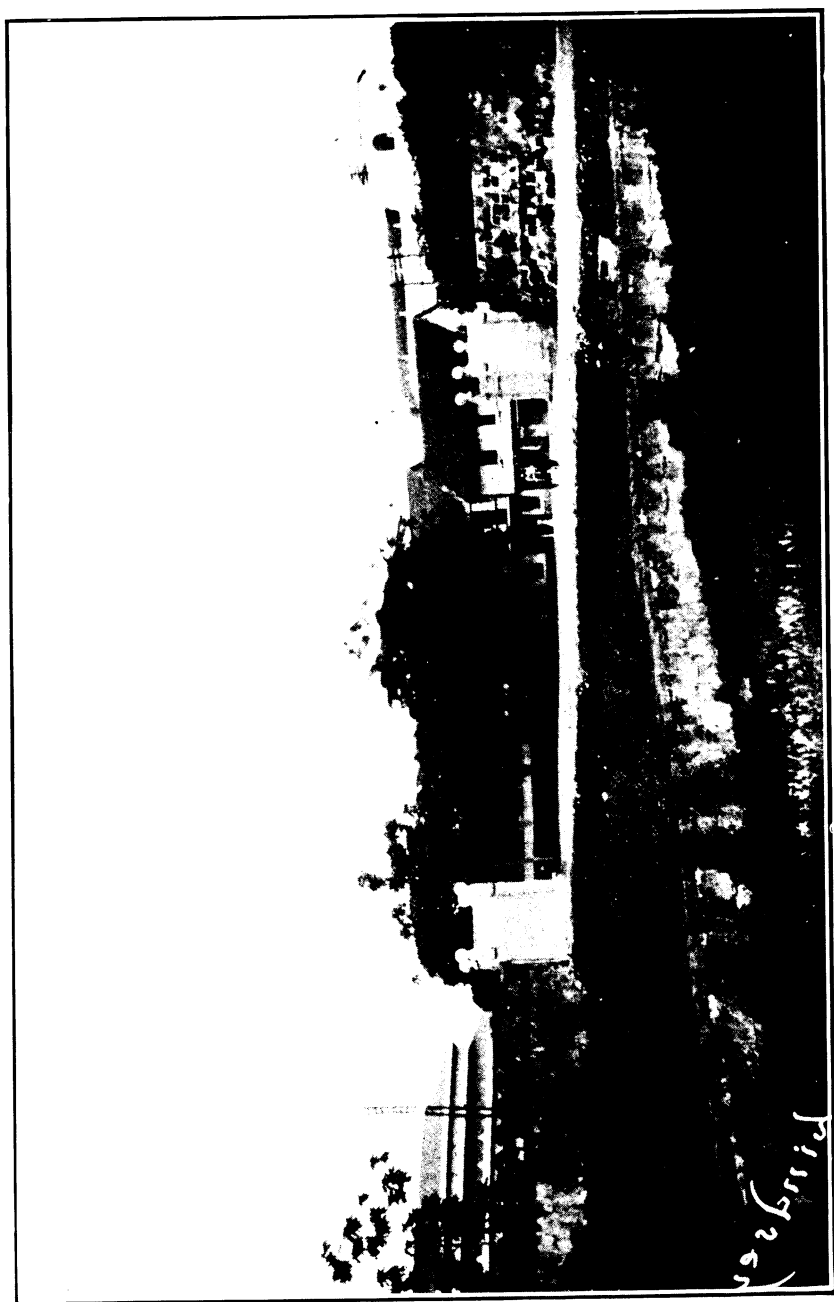
All of the sewage from the southerly side of the river may be readily diverted to the main pumping station on or near the Pasig River, which must in any event be provided to dispose of the larger portion of the flow coming from the northerly sections; the whole flow may then be discharged at the favorable point already referred to. The only difficulty arising from such a change in the plan is the necessity for providing a pipe or inverted siphon crossing of the river. The natural situation for such a crossing is a few hundred feet to the east of the Anda Monument in front of the Walled City, but some other more convenient point may possibly be found in the neighborhood.

The laying of siphons, such as would be required across the Pasig River, is, however, a common feature in sewerage systems, and their proper construction is thoroughly understood and gives rise to no special difficulties in maintenance where they are well designed and built.

There will necessarily be an increase in the cost of carrying out of the works on this plan over that already outlined, but I believe the advantages will far outweigh the extra cost. There will be the saving of the cost of an expensive second outlet at Calle Herran which will go far toward offsetting the crossing of the river and the building of a deep sewer through the Walled City. By the plans proposed the sewage of the south side of the city, with the exception of the Walled City, would be collected at a pumping station near the junction of the Paseo de Bagumbayan and Calle Nozaleda near the old Spanish powder house (the original Luneta) and would there be raised for its final descent by gravity toward the river, receiving the Walled City sewage by gravity on the way and discharging into the pump well on the north side of the Pasig.¹ From the main pumping station an excellent route presents itself for a cast-iron or other force main in the rear of the coal yards and behind the dry dock to a point near the light-house, where the structure in the bed of the harbor would begin. Up to this point the force main may be laid in a shallow trench with a gradual fall. By this plan the pipe would be accessible for inspection or repair at any time in this portion of its course.

From a point in the rear of the light-house and on the line of the present filling, a 40-inch cast-iron pipe should be laid in the bed of the

¹ The following is an alternative route which I suggest should be studied. The sewage from the pumping station on the south side of the river to be taken down the Malecon Drive, receiving on its way the sewage from the Intramuros District, then turning to the west in front of the commissary stores and crossing the river by siphon in the neighborhood of the Calle Vives to the main pumping station which might be located on some available site just to the west of the Calle Vives and to which the sewage from the north side of the river would be extended. The pumping station would here be in a favorable position with reference to the outlet, but it is possible that the cost, all things considered, may be greater than that arising from the route by way of the center of the Intramuros District.



VICTORIA STREET EXTENSION, SHOWING NEW GATEWAY IN WALL.

harbor for a distance of about a mile to where the water has a depth of about twelve feet. It will be necessary in the future to lay a second pipe, and when this is done I recommend that it be laid on a separate foundation and at an angle of about 25° to the north of the first pipe line. In this way two separate points of discharge will be secured which will hasten the dilution of the sewage when it increases in volume and will tend to prevent deposits. Recent borings show that the bed of the harbor is of so insecure a nature that it will be necessary to lay the outlet pipes upon a pile foundation composed of bents 6 feet on centers to which the pipes should be rigidly anchored. The back filling over the pipe should not be less than 8 feet in depth, then level with the present surface of the mud. It will be necessary to protect the outlet with heavy masonry thoroughly secured by clamps and dowels. There are four forces which may tend to wreck the pipe, and these should not be lost sight of; they are monsoons, earthquakes, vessels dragging anchors in a storm, and wrecks settling upon the line of pipes. By keeping the first pipe line somewhat to the north and parallel with a projection of the present northerly river wall, no interference will result from the future walling of the river or dredging of the bar, and by providing entirely separate pile foundations for the two pipes the laying of the second pipe can in no way jeopardize the first.

I have discussed this matter at length because it is important that every precaution should be taken to save the outlets from accident or destruction.

The changes which I have suggested in the collection of the sewage need not involve any delay in the execution of the work. All parts should be so arranged as to go on in such order of construction as to include the completion of the different portions at some predetermined time. The laying of the siphon across the river and the increased length of the outlet pipe are the principal additional features which I have suggested, and the building of these portions of the plant may be carried on in such a way as not to delay the completion of the whole work.

SIZES OF SEWERS.

The following is a brief synopsis of the basis used by Mr. Ingalls for computing the sizes of the sewers:

Present population, 223,029; future population (in 1950) 441,325; maximum rate of flow, smaller sewers, 120 gallons per capita, half full; maximum rate of flow, larger sewers, 100 gallons per capita, 0.6 and 0.7 full; ground water, one-third annual rainfall, 0.003 cubic feet per second per acre; value of μ Kutter formula, —0.013.

The capacity of the sewers is intended to provide for double the present population on the northerly side of the river and two and one-half times the present population on the southerly side of the river, which is, I

believe, a liberal provision. In remote districts, however, fixed numbers have been assumed, as for instance in Tondo, north of the Canal de la Reina Bridge, allowance has been made for 20,000 people; on Calle Cervantes north of the San Lazaro Hospital, 20,000; Sampaloc District, 30,000; east of Paco Estero, 20,000 (in addition to the 12,000 now living there), to accommodate the Santa Ana and Pandacan Districts.

The leakage of ground water will, I believe, prove larger than 0.003 cubic feet per second per acre, which is the same amount as that used at New Orleans and San Francisco. The value of μ for the brick sewers should, I think, be taken at 0.015. Both of these differences would have the tendency to make the sewers larger, but the population basis is so liberal that I have come to the conclusion that the sewers are practically large enough.

PUMPING STATIONS.

There are to be three pumping stations on the north side of the river and three on the south side, and this number will not be increased by any changes I have recommended. The minor stations are to be run by electricity and the main station on the southerly side of the river, which will not include the pumping of the sewage of the Walled City under the plan I have recommended, may perhaps be included in those to be operated by electrical motors; if not, this station should be furnished with appliances for using fuel oil to reduce the nuisance from smoke. When properly designed and maintained, these stations should be free from odors noticeable in the vicinity.

At the main pumping station all of the sewage of the city will have to be pumped, and there will be an advantage in this arrangement because a higher type of machinery may be used. The duty of the pumping engines here should run as high as 100,000,000 foot-pounds and probably higher.

As there are no settling tanks upon the system, the sewage must be thoroughly screened before admittance to the pumps. It is desirable that the pumping station should be so placed in connection with navigable water that the coal pockets may be filled with the minimum of handling.

The computed frictional losses in pumping through the outlet pipes should include additional friction due to tuberculation.

FORMS AND GRADES.

Good judgment seems to me to have been displayed in the fixing of the forms and grades of the sewers, so that sufficient velocity of flow will be obtained to keep the sewers as free from deposits as is practicable.

FLUSHING.

The larger part of any separate sewer system requires to be flushed at regular intervals. In the smaller sewers at the heads of the system

there is necessarily a more or less intermittent flow, which does not exist to the same extent in the larger collectors, due to the fact that the flow is better equalized from the union of many streams. To prevent deposits and offensive decomposition in the upper portions of the system it is therefore customary to provide automatic flush tanks or some other system. Mr. Ingalls favors the combination of a manhole and flush tank to be supplied by large connections with the water mains or from the esteros and to be operated by hand. There is much diversity of opinion among engineers as to the advisability of the use of flush tanks. It seems to me that in Manila at points remote from the esteros the use of automatic flush tanks will in some instances be found advisable. I should be in favor of limiting large connections with the water mains as far as practicable. The too free use of such connections tends to reduce the head in the water mains and in case of carelessness or where left running permanently under improper management the result is decidedly disastrous to the proper maintenance and protection of the water system. Connections with the esteros are to be commended for flushing purposes, as the use of this water is beneficial to the circulation of water in the esteros, but even in these cases the connections are to be carefully guarded to see that they are kept closed or the pumping system will be taxed with water which should not be pumped and the sewers in the end overtaxed unnecessarily. There are many dead ends upon the 8-inch pipes which are in close proximity which might be united and served by a common flushing arrangement, and before contracts are let I advise a careful examination and study of this subject.

MANHOLES AND SEWER VENTILATION.

As perforated manhole covers will not be practicable in Manila, ventilation of the sewers must be accomplished by omitting traps from house connections and using the soil pipes for ventilators, as suggested by Mr. Ingalls. This will necessitate excellent construction and impartial inspection—otherwise the sewers may be ventilated into the houses; in fact, this is only one of the many portions of the system which will require the services of skilled and honest men.

HOUSE CONNECTIONS AND PLUMBING.

The positions of house connections should I believe be fixed before the contract plans are made. There are many native districts in the city where nipa houses are the common form of construction for dwellings. To provide proper sanitary facilities for these districts will require some very simple arrangement for the removal of excreta to the sewers. Perhaps that suggested by Mr. Ingalls will prove to be the best, viz., a common public sanitary for each square, carefully located and carefully maintained. In thickly populated portions of the city

where at present only the most lamentable provision for the removal of excreta prevails, a rigid system of plumbing regulations will be necessary and the fixtures themselves should be of an approved form. I believe it will be a step in the right direction if this matter is taken in hand early in the construction of the sewerage system and fixtures, specifications prepared, and provisions made for the stamping of all appliances with a seal of approval before they can be used. It will be an extremely difficult matter for future boards of health to battle with imperfect sanitation due to defective plumbing after it is once in place, and it will on the other hand be an easy matter to maintain a good system if it is taken in hand in time and properly provided for.

GENERAL RECOMMENDATIONS.

Before contract plans and specifications are prepared I believe the positions and alignments and grades of the sewers should be carefully studied and fixed, so that every detail possible to arrange for will be known and provided for before the work is advertised. Any expense involved in such an exploration of the ground and study of details will be more than saved in the execution of the contracts, and litigation may be largely avoided.

The building of this extensive system would involve the exercise of the greatest patience and highest skill under the most advantageous circumstances and where surrounded by manufactures and machine shops of the best type, but here in Manila the difficulties will be multiplied enormously. The satisfactory construction of the system will therefore require an unusual amount of most careful thought and the preparation of thoroughly studied detail plans before the work is begun in order to determine the time to be allowed for the building of each portion of the plant, so that no prolonged delays may ensue. Particularly is this true where machinery and supplies will be needed which must come from a distance of several thousand miles.

The engineer in his labors should receive the cordial and hearty support of all boards who may supervise or control in any degree the selection of his assistants, the fixing of their compensation, or the purchase of his supplies. The more perfectly the details of the work are understood and appreciated by all, the less friction will be involved in the great undertaking.

Very faithfully,

DESMOND FITZGERALD,
Consulting Engineer.

HON. ARSENIO C. HERRERA,
President of the Municipal Board.

SUPPLEMENTARY REPORT OF MR. OWEN L. INGALLS UPON THE MANILA SEWERAGE SYSTEM.

MANILA, P. I., *September 20, 1904.*

SIRS: In view of the fact that it may be deemed advisable to collect and discharge all sewage into the bay at one pumping station, to be located on the north side of the river, as suggested by Mr. Desmond Fitzgerald, Consulting Engineer, in his report upon the proposed system of sewerage for the city of Manila, P. I., I have the honor to invite attention to project No. 2, which is outlined on plate No. 3 of this report. This project embraces all the important features suggested in the report of Mr. Fitzgerald, and is almost identical with the one described and recommended in my original report upon the sewerage system for the city, except that instead of discharging all sewage collected south of the Pasig River into the bay on the line of Calle Herran at a point located one-half mile from shore it is the intention to divert the flow northward from Calle Herran along Calle Nueva, across Camp Wallace, through Intramuros, crossing the river by means of an inverted siphon at a point located nearly opposite the custom-house, and delivering the flow from the south side of the city to a main pumping station to be located at the foot of Calle Azcarraga. This pumping station will be designed of sufficient capacity to discharge all the sewage of the city into the bay at a point located at least 1 mile from shore and approximately in line with the mouth of the Pasig River. The project as outlined above is unquestionably the most feasible and by far the cheapest alternate plan that can be selected by which all the sewage of the city will be collected and discharged into the bay at one pumping station located on the north side of the river. The proposed change in the original plan will necessitate a slight modification in the arrangement of some of the larger sewers, but no increase in the number of the pumping stations will be found necessary, although the quantity of sewage to be pumped and the amount of power estimated necessary for operating three of said stations will be affected by this alteration.

The main pumping station, which is to be located at the foot of Calle Azcarraga in this project, will be designed to accommodate a flow amounting to 52,600,000 gallons per day, which is at a rate of 4,870 cubic feet per minute, and is equivalent to a 100-gallon rate of water consumption for the entire estimated future population of the city, plus the ground-water seepage. The total lift at this pumping station at the

time of mean high tide, including friction head in the force mains, will amount to 24.8 feet, necessitating 227 horsepower while pumping the estimated quantity of sewage per day. This will require the installation of three 26,300,000-gallon pumping engines, with 450-horsepower boiler capacity to do the work, and at the same time have sufficient reserve. Two discharge pipes of cast iron 42 inches in diameter will be required, each having a flow with a velocity of 4.2 feet per second when discharging the full amount of sewage. One 42-inch outfall pipe, two pumping engines of 26,000,000 gallons capacity each, and three boilers of 110 horsepower each are recommended for the present requirements in this station.

The lift pumping station which will be required at the intersection of Calzada de Vidal and Calle Nozaleda will be the most important on the south side of the Pasig River, and will be designed to care for an ultimate flow of 12,500,000 gallons per day. The present needs of the city will require centrifugal pumps operated by gas engines, or electric motors installed in duplicate, each capable of lifting 5,200,000 gallons of sewage and ground water per day, or 481 cubic feet per minute, from an approximate grade elevation of 20 feet and discharging the same into a brick sewer 3.75 feet in diameter, with a grade elevation of 29 feet. This will cause a lift of 9 feet and will require approximately 9 horsepower to perform the work.

The only other pumping station that will be affected by this proposed change will be located at the intersection of Calle Nueva and Calle Herran, and will be designed to care for an ultimate flow of 8,800,000 gallons per day. For the present this station will require the installation of centrifugal pumps and motive power in duplicate, each capable of lifting 2,400,000 gallons per day, or 222 cubic feet per minute, from an approximate grade elevation of 19.5 feet, and discharging the same into a brick sewer 3.25 feet in diameter, with an approximate grade elevation of 24.5 feet. This will require a lift of 5 feet, and necessitate 3 horsepower to perform the work. The estimated cost for carrying out the plan which is outlined in this report (see detailed estimate) amounts to \$1,761,327.50, which is an increase of about \$150,000 in the estimated cost of the work over the former estimate, wherein provision was made for two outlets into the bay instead of one, as suggested in the report of Mr. Fitzgerald.

A slight additional annual expense will also be incurred by carrying out this project, due to the fact that additional power amounting to about 22 per cent will be required for operating the various pumping stations throughout the city.

Very respectfully,

O. L. INGALLS,

Engineer in Charge Manila Sewerage System.

The MUNICIPAL BOARD, *Manila, P. I.*

Detailed estimate of cost of sewerage system, Project No. 2, in accordance with plan suggested by Mr. Desmond Fitzgerald, Consulting Engineer.

NORTH SIDE OF RIVER.

MAIN INTERCEPTING SEWER ALONG CALLE AZCARRAGA FROM THE BAY
TO THE ROTUNDA.

4.75-foot brick sewer, 600 feet, at \$24.....	\$14,400.00
4.75-foot brick sewer, 990 feet, at \$21.....	20,790.00
4.50-foot brick sewer, 2,220 feet, at \$16.50.....	36,630.00
4.25-foot brick sewer, 1,780 feet, at \$15.....	26,700.00
3.75-foot brick sewer, 3,400 feet, at \$13.50.....	45,900.00
2.75 by 4.12 foot brick sewer, 720 feet, at \$13.50.....	9,720.00
2.50 by 3.75 foot brick sewer, 1,310 feet, at \$12.50.....	16,375.00
2.25 by 3.37 foot brick sewer, 1,170 feet, at \$11.50.....	13,455.00
6-inch standpipe, 2,500 feet, at \$0.40.....	1,000.00
36-inch cast-iron pipe, 690 feet, at \$16.....	11,040.00
Manholes, 34, at \$60.....	2,040.00
Total	198,050.00
Ten per cent for contingencies.....	19,805.00
Aggregate	217,855.00

DISTRICT SEWERS.

San Nicolas:

8-inch pipe sewer, 25,200 feet, at \$1.30.....	\$32,760.00
10-inch pipe sewer, 2,170 feet, at \$2.55.....	5,533.50
12-inch pipe sewer, 160 feet, at \$3.....	480.00
15-inch pipe sewer, 280 feet, at \$3.75.....	1,050.00
18-inch pipe sewer, 320 feet, at \$4.90.....	1,568.00
21-inch pipe sewer, 1,350 feet, at \$6.35.....	8,572.50
4-foot brick sewer, 1,450 feet, at \$20.....	29,000.00
4.25-foot brick sewer, 1,520 feet, at \$22.....	33,440.00
6-inch standpipe, 1,920 feet, at \$0.40.....	768.00
20-inch cast-iron pipe, 90 feet, at \$15.....	1,350.00
Flushing tanks, 65, at \$100.....	6,500.00
Manholes, 69, at \$60.....	4,140.00
Total	125,162.00
Ten per cent for contingencies.....	12,516.20
Aggregate	137,678.20

Tondo:

8-inch pipe sewer, 17,600 feet, at \$1.30.....	22,880.00
10-inch pipe sewer, 3,230 feet, at \$2.55.....	8,236.50
2 by 3 foot brick sewer, 2,750 feet, at \$10.50.....	28,875.00
2.25 by 3.37 foot brick sewer, 1,600 feet, at \$11.25.....	18,000.00
6-inch standpipe, 1,500 feet, at \$0.40.....	6,000.00
Flushing tanks, 31, at \$100.....	3,100.00
Manholes, 40, at \$60.....	2,400.00
Total	89,491.50
Ten per cent for contingencies.....	8,949.15
Aggregate	98,440.65

NORTH SIDE OF RIVER—Continued.

DISTRICT SEWERS—continued.

Santa Cruz (including that part of Quiapo west of Estero de Quiapo):

8-inch pipe sewer, 25,680 feet, at \$1.30.....	\$33,384.00
10-inch pipe sewer, 1,870 feet at \$2.55.....	4,768.50
12-inch pipe sewer, 280 feet, at \$3	840.00
15-inch pipe sewer, 2,030 feet, at \$3.75.....	7,612.50
18-inch pipe sewer, 1,080 feet, at \$4.90.....	5,292.00
21-inch pipe sewer, 1,400 feet, at \$6.35.....	8,890.00
2 by 3 foot brick sewer, 2,320 feet, at \$10.50.....	24,360.00
2.25 by 3.37 foot brick sewer, 1,800 feet, at \$11.50.....	20,700.00
6-inch standpipe, 2,600 feet, at \$0.40.....	1,040.00
Flushing tanks, 54, at \$100.....	5,400.00
Manholes, 77, at \$60.....	4,620.00
Total	116,907.00
Ten per cent for contingencies.....	11,690.70
Aggregate	128,597.70

Binondo:

8-inch pipe sewer, 20,500 feet, at \$1.30.....	26,650.00
10-inch pipe sewer, 2,560 feet, at \$2.55.....	6,528.00
12-inch pipe sewer, 800 feet, at \$3.....	2,400.00
15-inch pipe sewers, 110 feet, at \$3.75.....	412.50
18-inch pipe sewer, 120 feet, at \$4.90.....	588.00
16-inch cast-iron pipe, 95 feet, at \$10.....	950.00
6-inch standpipe, 900 feet, at \$0.40.....	360.00
Flushing tanks, 42, at \$100.....	4,200.00
Manholes, 60, at \$40.....	2,400.00
Total	44,488.50
Ten per cent for contingencies.....	4,448.85
Aggregate	48,937.35

San Miguel:

8-inch pipe sewer, 6,670 feet, at \$1.30.....	8,671.00
10-inch pipe sewer, 1,010 feet, at \$2.55.....	2,575.50
12-inch pipe sewer, 950 feet, at \$3.....	2,850.00
13-inch pipe sewer, 1,050 feet, at \$3.75.....	3,937.50
18-inch pipe sewer, 260 feet, at \$4.90.....	1,274.00
6-inch standpipe, 720 feet, at \$0.40.....	288.00
Flushing tanks, 9, at \$100.....	900.00
Manholes, 25, at \$40.....	1,000.00
Total	21,496.00
Ten per cent for contingencies.....	2,149.60
Aggregate	23,645.60

NORTH SIDE OF RIVER—Continued.

DISTRICT SEWERS—continued.

Quiapo:

8-inch pipe sewer, 6,300 feet, at \$1.30.....	\$8,190.00
10-inch pipe sewer, 1,740 feet, at \$2.55.....	4,437.00
15-inch pipe sewer, 340 feet, at \$3.75.....	1,275.00
18-inch pipe sewer, 1,130 feet, at \$4.90.....	5,537.00
21-inch pipe sewer, 970 feet, at \$6.35.....	6,159.50
2 by 3 main sewer, 550 feet, at \$10.50.....	5,775.00
6-inch standpipe, 1,150 feet, at \$0.40.....	460.00
Flushing tanks, 11, at \$100.....	1,100.00
Manholes, 22, at \$60.....	1,320.00
Total	34,253.50
Ten per cent for contingencies.....	3,425.35
Aggregate	37,678.85

Sampaloc:

8-inch pipe sewer, 7,370 feet, at \$1.30.....	9,581.00
12-inch pipe sewer, 950 feet, at \$3.....	2,850.00
15-inch pipe sewer, 710 feet, at \$3.75.....	2,662.50
18-inch pipe sewer, 2,280 feet, at \$4.90.....	11,172.00
2 by 3 foot main sewer, 1,000 feet, at \$10.50.....	10,500.00
6-inch standpipe, 870 feet, at \$0.40.....	348.00
Flushing tanks, 14, at \$100.....	1,400.00
Manholes, 40, at \$60.....	2,400.00
Total	40,913.50
Ten per cent for contingencies.....	4,091.35
Aggregate	45,004.85

OUTFALL SEWERS.

5,000 linear feet 42-inch cast-iron pipe, 1,480 tons, at \$30.....	\$44,400.00
Foundations and laying 5,000 feet 42-inch pipe, at \$13.....	65,000.00
Dredging channel for pipes.....	5,000.00
Construction of protection to outlet.....	2,000.00
Total	116,400.00
Ten per cent for contingencies.....	11,640.00
Aggregate	128,040.00

MAIN PUMPING STATION.

Cost of ground for building.....	\$9,000.00
2 26,000,000-gallon pumping engines, at \$40,000.....	80,000.00
3 110-horsepower boilers, at \$25 per horsepower.....	8,250.00
Cost of excavations for pump wells, gates, cage chambers, etc., including lining of same and preparations of all foundations.....	30,000.00
Engine and boiler house.....	24,000.00
Special castings, valves, etc.....	12,500.00
Total	163,750.00
Ten per cent for contingencies.....	16,375.00
Aggregate	180,125.00

NORTH SIDE OF RIVER—Continued.

LIFT STATION, CALLE ARRANQUE.

Purchase of lease for ground for station.....	\$3,000.00
2 motors, connections, and pumps, at \$5,000.....	10,000.00
Building above foundations.....	6,000.00
Excavation from pump wells, gates, etc., including cost of lining.....	5,000.00
Special castings, etc.....	4,000.00
Total	28,000.00
Ten per cent for contingencies.....	2,800.00
Aggregate	30,800.00

LIFT STATION, PLAZA DE SANTA ANA.

Ground for station.....	\$7,000.00
2 motors, connections, and pumps, at \$3,500.....	7,000.00
Building above foundations.....	5,000.00
Excavation for pump wells, gates, etc., including cost of lining.....	5,000.00
Special castings, etc.....	3,000.00
Total	27,000.00
Ten per cent for contingencies.....	2,700.00
Aggregate	29,700.00

SOUTH SIDE OF RIVER.

PASIG RIVER SIPHON.

1,400 linear feet 24-inch flexible joint pipe, 205 tons, at \$40.....	\$8,200.00
Dredging channel for pipe.....	3,000.00
Foundations and laying 700 feet, at \$40.....	28,000.00
Removal and restoration of river walls.....	7,500.00
Total	46,700.00
Ten per cent for contingencies.....	4,670.00
Aggregate	51,370.00

MAIN SEWER, CALLES CABILDO, NUEVA, AND HERRAN, FROM PASIG RIVER TO
CALLE PEÑAFRANCIA.

4-foot brick sewer, 1,700 feet, at \$18.....	\$30,600.00
3.75-foot brick sewer, 2,700 feet, at \$17.....	45,900.00
3.25-foot brick sewer, 4,220 feet, at \$15.....	63,300.00
2.50 by 3.75 foot brick sewer, 2,060 feet, at \$13.....	26,780.00
2.25 by 3.37 foot brick sewer, 1,860 feet, at \$11.50.....	21,390.00
2 by 3 foot brick sewer, 1,420 feet, at \$10.50.....	14,910.00
6-inch standpipe, 2,250 feet, at \$0.40.....	900.00
Manholes, 40, at \$60.....	2,400.00
Total	206,180.00
Ten per cent for contingencies.....	20,618.00
Aggregate	226,798.00

SOUTH SIDE OF RIVER—Continued.

INTRAMUROS.

8-inch pipe sewer, 18,060 feet, at \$1.30.....	\$23,478.00
15-inch pipe sewer, 550 feet, at \$3.75.....	2,062.50
18-inch pipe sewer, 800 feet, at \$4.90.....	3,920.00
6-inch standpipe, 1,200 feet, at \$0.40.....	480.00
Flushing tanks, 36, at \$100.....	3,600.00
Manholes, 35, at \$60.....	2,100.00
Rebuilding stone drain, 500 feet, at \$12.....	6,000.00
Total	41,640.50
Ten per cent for contingencies.....	4,164.05
Aggregate	45,804.55

ERMITA.

8-inch pipe sewer, 30,820 feet, at \$1.30.....	\$40,066.00
10-inch pipe sewer, 3,800 feet, at \$2.55.....	9,690.00
12-inch pipe sewer, 2,200 feet, at \$3.....	6,600.00
15-inch pipe sewer, 3,130 feet, at \$3.75.....	11,737.50
18-inch pipe sewer, 1,450 feet, at \$4.90.....	7,105.00
21-inch pipe sewer, 440 feet, at \$6.35.....	2,794.00
24-inch pipe sewer, 200 feet, at \$7.75.....	1,550.00
6-inch standpipe, 4,200 feet, at \$0.40.....	1,680.00
Flushing tanks, 46, at \$100.....	4,600.00
Manholes, 80, at \$60.....	4,800.00
Total	90,622.50
Ten per cent for contingencies.....	9,062.25
Aggregate	99,684.75

MALATE.

8-inch pipe sewer, 6,310 feet, at \$1.30.....	\$8,203.00
10-inch pipe sewer, 1,200 feet, at \$2.55.....	3,060.00
12-inch pipe sewer, 1,550 feet, at \$3.....	4,650.00
15-inch pipe sewer, 600 feet, at \$3.75.....	2,250.00
18-inch pipe sewer, 1,120 feet, at \$4.90.....	5,488.00
21-inch pipe sewer, 700 feet, at \$6.35.....	4,445.00
6-inch standpipe, 1,400 feet, at \$0.40.....	560.00
Flushing tanks, 10, at \$100.....	1,000.00
Manholes, 25, at \$60.....	1,500.00
Total	31,156.00
Ten per cent for contingencies.....	3,115.60
Aggregate	34,271.60

PACO.

8-inch pipe sewer, 4,970 feet, at \$1.30.....	\$6,461.00
10-inch pipe sewer, 460 feet, at \$2.55.....	1,173.00
12-inch pipe sewer, 460 feet, at \$3.....	1,380.00
21-inch pipe sewer, 4,000 feet, at \$6.35.....	25,400.00

SOUTH SIDE OF RIVER—Continued.

PACO—continued.

6-inch standpipe, 1,000 feet, at \$0.40.....	\$400.00
Flushing tanks, 10, at \$100.....	1,000.00
Manholes, 30, at \$60.....	1,800.00
Total	37,614.00
Ten per cent for contingencies.....	3,761.40
Aggregate	41,375.40

LIFT STATION, CALLE HERRAN, NEAR ESTERO DE PACO.

Ground for station.....	\$5,000.00
2 motors and pumps, 800,000 gallons each.....	4,000.00
Building, pump well, foundations, etc.....	3,500.00
Total	12,500.00
Ten per cent for contingencies.....	1,250.00
Aggregate	13,750.00

LIFT PUMPING STATION, CALLE NUEVA AND CALLE HERRAN.

Ground for station.....	\$5,000.00
2 motors and pumps, 2,400,000 gallons each.....	6,000.00
Building, foundations, etc.....	5,000.00
Excavation for pump wells, gates, etc., including cost of lining.....	4,500.00
Special castings, etc.....	2,500.00
Total	23,000.00
Ten per cent for contingencies.....	2,300.00
Aggregate	25,300.00

LIFT STATION, CALZADA DE VIDAL.

2 5,200,000-gallon pumps and engines.....	\$5,500.00
2 boilers, 18 horsepower each.....	1,200.00
Excavation for pump wells, including lining and foundations for machinery	8,000.00
Engine and boiler house.....	20,000.00
Special castings, etc.....	3,000.00
Total	37,700.00
Ten per cent for contingencies.....	3,770.00
Aggregate	41,470.00

SUMMARY OF COST FOR WORK PROPOSED ON NORTH SIDE OF RIVER.

Main intercepting sewer, Calles Azcarraga and Alix, from bay to Rotunda	\$217,855.00
San Nicolas District.....	137,678.20
Tondo District	98,440.65
Santa Cruz District (including that part of Quiapo west of Estero de Quiapo).....	128,597.70

SUMMARY OF COST FOR WORK, ETC.—Continued.

Binondo District	\$48,937.35
San Miguel District.....	23,645.60
Quiapo District, not already included.....	37,678.85
Sampaloc District	45,004.85
Outfall sewer	128,040.00
Main pumping station, north side of river.....	180,125.00
Lift pumping station, Calle Arranque.....	30,800.00
Lift pumping station, Plaza de Santa Ana.....	29,700.00
Contingencies not otherwise provided for.....	50,000.00

Total	1,156,503.20
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SUMMARY OF COST FOR WORK PROPOSED ON SOUTH SIDE OF RIVER.

Pasig River siphon.....	\$51,370.00
Main sewer, Calles Cabildo, Nueva, and Herran, from Pasig River to Calle Peñafrancia.....	226,798.00
Intramuros District	45,804.55
Ermita District	99,684.75
Malate District	34,271.60
Paco District	41,375.40
Lift pumping station, Calle Herran, near Estero de Paco.....	13,750.00
Lift pumping station, Calle Nueva.....	25,300.00
Lift pumping station, Calzada de Vidal.....	41,470.00
Contingencies not otherwise provided for.....	25,000.00

Total	604,824.30
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Total for work on north side of river.....	1,156,503.20
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Grand total	1,761,327.50
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REPORT OF THE CHIEF OF POLICE.

DEPARTMENT OF POLICE,

Manila, P. I., July 25, 1904.

SIR: In compliance with section 25, Act No. 183, United States Philippine Commission, enacted July 31, 1901, I have the honor to submit the following report covering the operations of this department for the fiscal year 1904:

The Police Department, as at present constituted, comprises the following: One Chief of Police, 1 assistant chief, 1 inspector, 1 surgeon, 1 assistant surgeon, 7 captains, 6 lieutenants, 23 first-class sergeants, 18 second-class sergeants, 10 third-class sergeants, 324 first-class patrolmen, 98 second-class patrolmen, 286 third-class patrolmen; 1 clerk class 6, 2 clerks class 7, 4 clerks class 8, 3 clerks class 9, 1 clerk class 10, 2 clerks Class A, 1 Chinese interpreter Class A, 7 clerks Class D, 3 messengers Class K.

Secret Service Bureau: One Chief of Secret Service, 1 detective class 5, 1 class 6, 1 class 7, 2 class 8, 5 class 9, 2 class 10, 1 Class A, 3 Class D, 3 Class F, 6 Class J.

Launch crew: One master class 9, 1 mate Class A, 1 engineer Class F, 3 engineers Class H, 6 firemen Class J, 8 deck hands Class K, 4 boatmen Class K, 3 laborers Class K.

PRESENT STRENGTH.

One Chief of Police; 1 assistant chief; 1 inspector, on leave of absence; 1 surgeon; 1 assistant surgeon, at present on leave of absence in the United States as Honorary Commissioner to the Exposition; 7 captains, 3 of whom are at present on leave—2 in the United States and 1 in the Philippine Islands (those absent in the United States are Capts. Thomas F. Crowley, formerly of precinct 1, and George Seaver, formerly of precinct 4; on leave in the Philippines, Capt. Jose de Crame, precinct 5)—6 lieutenants, 5 of whom are present for duty and 1 (Alexander H. Harmon); on leave in the United States; 23 first-class sergeants, 16 for duty, 1 suspended, 1 sick, and 5 on leave; absent in the United States, Sergeants Walters and Littlefield, of precinct 1, and Sergeants Gardner, Simmons, and Buschman, of precinct 4; 23 first-class roundsmen, 18 for duty, 4 on leave in United States (Roundsmen Goulette, river and harbor precinct; Kearney, precinct 1; Harris and Herrington, precinct 4; 1 on leave in the Islands (Roundsmen Searcy, precinct 3); 285 first-class patrolmen for duty, 10 sick,

1 suspended, 14 on leave (total first-class patrolmen, 310); second-class sergeants, 11 for duty, 1 sick, and 1 on leave (total, 13); second-class roundsmen, 7 for duty, 1 on leave (total, 8); second-class patrolmen, 20 for duty (total, 20); third-class sergeants, 13 for duty, 1 on leave (total, 14); third-class roundsmen, 16 for duty, 1 on leave, 1 suspended (total, 18); third-class patrolmen, 323 for duty, 1 suspended, 13 on leave, 5 sick (total, 342).

Police launch: One master for duty, 1 mate for duty, 3 engineers for duty, 1 suspended (total, 4); 5 firemen for duty, 1 on leave (total, 6); 12 sailors for duty.

Secret Service Bureau: One Chief present for duty; 25 employees (21 present for duty and 4 on leave).

Office force: One chief clerk for duty; 1 storekeeper for duty; 17 clerks for duty, 2 on leave (total, 21); 3 messengers for duty.

From the above actual strength is composed the river and harbor police, which consists of 3 first-class sergeants, 3 first-class roundsmen, 24 first-class patrolmen, and 12 third-class patrolmen.

It will be noticed that the number of second-class sergeants, roundsmen, and patrolmen is less than that authorized by law, while these positions in the grade of third-class are in excess. Your honorable Board is evidently familiar with the fact that promotions from third to second-class are made only when the third-class have acquired a working knowledge of English, and then they are tested by noncompetitive examinations, conducted by the Philippine Civil Service Board for the Department of Police only.

NIGHT SCHOOLS.

There are at present six night schools in the department for the purpose of giving instructions in English to the native police, and the results of these schools have proved to be very beneficial to the natives of the force. The difference of pay between second and third-class is such that it makes it encouraging for the third-class to learn the English language, and they are all acquainted with the reality that to receive promotion to this grade it becomes incumbent upon them to give their leisure hours to study. The schools are voluntary, and the attendance differs little from what it might be if they were compulsory.

There are 207 Americans on the force at present who have acquired a working knowledge of Spanish, 79 who have a working knowledge of Tagalog, and 47 who have a knowledge of both. There are therefore few American members of the force who have not a slight knowledge of Spanish or Tagalog, and these are the ones who were not in these Islands during the military régime.

I am glad to be able to report that the natives all have a slight knowledge of English and can direct strangers, upon inquiry, to any part of the city.

DISCIPLINE.

I can positively assert, without reservation, that the discipline and efficiency of the Manila police force has been maintained and that it ranks equal to that of any large city in the United States, and is so conceded by all conscientious, fair-thinking people.

The provisions of Act No. 392, United States Philippine Commission, has at all times, when not inconsistent with the needs of the service, been strictly adhered to, and at present there are 5 men receiving less salaries than that authorized by Act No. 1048. The department has for the past six months been running with a shortage of about 20 first-class and 25 third-class patrolmen.

Every effort has been made to keep within the appropriations authorized, and in no case have vacancies been filled except when really needed to properly perform the services required.

During the past fiscal year there have been 379 members of the force tried before the summary court in the Police Department. The headings under which these charges come are loitering on duty, conduct unbecoming police officers, gambling, nonpayment of debts, carelessness, making false statements, disobedience of orders, abandoning post, abuse of authority, disorderly conduct, absence from duty, drunkenness while on duty.

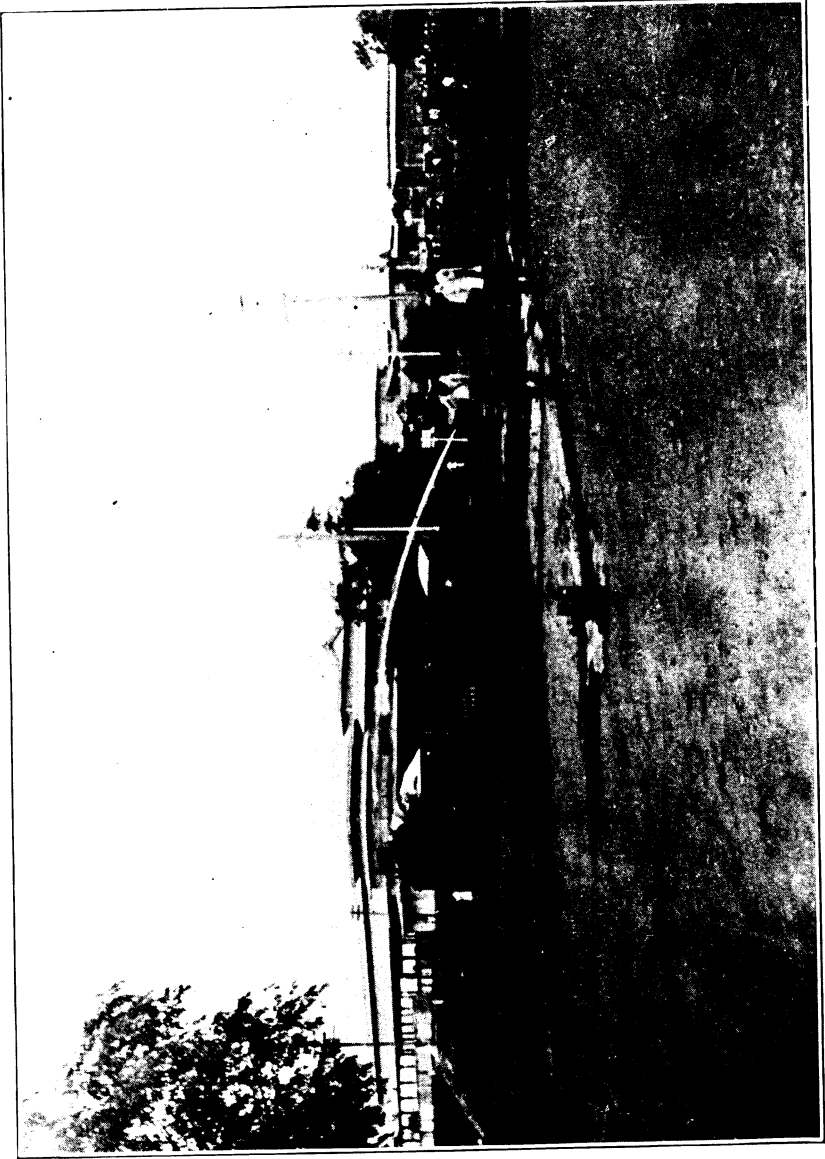
While this is a large number of trials, it is small when is taken into consideration the strength of the force, combined with the number of temptations which police officers encounter daily. It will be noticed, with great satisfaction, that under the heading of these charges by summary court there have been no cases of bribery, and this I consider an excellent showing among so large a body of men. The cases were divided as follows: Precinct 1, 57; precinct 2, 69; precinct 3, 44; precinct 4, 44; precinct 5, 108; precinct 6, 47; river and harbor, 8; mounted detachment, 2.

MOUNTED DETACHMENT.

This is a small detachment, composed of 1 noncommissioned officer and 8 patrolmen, quartered at El Deposito. Their duties consist of patrolling and suppressing ladronism in the city suburbs. These men are mounted, having at their disposal for service 7 American horses, 4 Chinese ponies, and 1 native pony. They have been often called upon by the Constabulary in that district, and always rendered immediate assistance. Their coöperation with the Constabulary has been excellent, and, due to this, many hard characters have been captured and punished.

CHANGES IN PRECINCT COMMANDERS.

During the year there were changes made in the transferring of precinct commanders to different precincts. Those transferred were Capt.



STREET SPRINKLING—THE OLD WAY, WHICH IS FAST BEING SUPERSEDED.

Mark Scott, from precinct 2 to 4; Capt. Jack Dawson, from precinct 1 to 2; Capt. Thomas F. Crowley, from precinct 3 to 1; Capt. Walter E. Wilson, from river and harbor to precinct 3; and Sergt. William E. Wichman, precinct 3, placed in command of river and harbor police.

While these changes in no way reflect on the past service of the officers, it was done with a view to improving the efficiency of the service, that each officer may be able upon being transferred to perform his duties more satisfactorily and in less time than if he is unfamiliar with duty in different parts of the city. It is contemplated to rotate the different precinct commanders at least once a year, but, however, time and experience will indicate this matter, therefore no permanent order is made regarding this at the present time.

SERVICE PAY.

One of the best things that took place in this department during the last half of the fiscal year was the increase of pay given to members of the Police Department based on the length of service, as it may hereafter be noted that among the force there is undoubtedly less restlessness and discontent than there was one year ago. This is solely due to the system on which the members are compensated, which is as follows:

First-class patrolmen: First year, \$900; second year, \$1,000; third year, \$1,080; fourth year, \$1,140.

Second-class patrolmen: First year, \$300; second year, \$375; third year, \$412; fourth year, \$450.

Third-class patrolmen: First year, \$240; second year, \$300; third year, \$330; fourth year, \$360.

The number of patrolmen who have been affected by the increase of pay are as follows: First-class patrolmen: Second year, 55; third year, 51; fourth year, 83; making a total of 189.

Second-class patrolmen: Second year, none; third year, 12; fourth year, 7; total, 19.

Third-class patrolmen: Second year, 57; third year, 70; fourth year, 99; total, 226.

Increases in other positions were as follows:

Three second-class lieutenants, from \$1,200 to \$1,300 per annum; first-class sergeants, from \$1,200 to \$1,300 per annum; roundsmen, from \$1,020 to \$1,200 per annum; second-class sergeants, from \$450 to \$600 per annum; roundsmen, from \$375 to \$480 per annum.

CHANGES IN THE DEPARTMENT.

During the fiscal year changes in the department were as follows: Probational appointments: Americans, 179; natives, 126; total, 305. Temporary appointments: Americans, 103; natives, 2; total, 105; making a grand total of appointments in the department of 410. Dis-

charged: Americans, own request, 221; natives, 46; total, 267; Americans, for good of the service, 59; natives, 92; total, 151; incompetency, Americans, 1; natives, 6; total, 7; for sickness exceeding six months and not in accordance with the present law in force, Americans, 1. Deaths: Americans, 4; natives, 2; total, 6; grand total of all, 432. There were 624 absent on accrued leave during the year: Americans, 335; natives, 289; sick, as provided for in Act No. 80, section 3, up to and including December 31, 1903, Americans, 354; natives, 358; total, 712. Vacation leave, from January 1 to June 30, 1904, both dates inclusive: Americans, 380; natives, 519; total, 899. Transfers to the department: Americans, 4; natives, 2; total, 6. Transfers from the department: Americans, 21; natives, 2; total, 23. Reinstatements: Americans, 32; natives, 7. Promotions: Americans, 33; natives, 36. Reductions: American, 1. Americans who died were Roundsmen W. H. Ward and James F. Bulger, Patrolmen John E. Young and Fred Nagel; natives, Antonio Ybalio and Julian Tajosa. Death of Roundsman Ward was caused by amebic dysentery; of Roundsman Bulger, subacute nephritis; John E. Young, acute alcoholism; Fred Nagel, apoplexy; Antonio Ybalio, beri-beri; Julian Tajosa, abscess of the lungs and chronic dysentery. These members were all buried by the Police Department from funds obtained by fines imposed upon members by sentence of summary court, and this especially caused my recommendation on several occasions to the Board, requesting that Act No. 1096, enacted March 30, 1904, be not enforced on the uniformed members of the department owing to the fact that there may be men who die in the service not having to their credit sufficient accrued leave from which money could be obtained to defray their funeral expenses. I trust that the Board will give this consideration and urge that the above recommendation receive consideration.

ARRESTS.

During the fiscal year there were 17,383 arrests made, which is a decrease of 135 from the previous year.

Number of arrests during the year.

BY PRECINCTS.

Precinct 1	2, 084
Precinct 2	5, 330
Precinct 3	2, 220
Precinct 4	2, 084
Precinct 5	2, 689
Precinct 6	822
River and harbor	697
Detective bureau	1, 457
Total	17, 383

Number of arrests during the year—Continued.

BY SEX.

Males	14, 858
Females	2, 525

BY NATIONALITY.

Americans	1, 256
Spaniards	87
Natives	13, 402
Europeans	176
Chinese	2, 291
Japanese	149
East Indians	15
Africans	1
Cubans	1
Arabians	1
Spanish-Americans	3
Australians	1

Total 17, 383

Enlisted men:

United States Army, included in table	222
United States Navy, included in table	16
United States Marine Corps	2

Total enlisted men 240

The following shows the heading under which these arrests were made:

Charge.	Num-ber.	Charge.	Num-ber.
Assault	446	Conducting a gambling game	64
Attempt to kill	2	Cockfighting in the public street	16
Accessory to forgery	1	Contempt of court	5
Abandoning vehicle	356	Collector for a gambling game	13
Accessory to robbery	11	Conducting a house of prostitution	3
Attempted rape	8	Coolie occupying the sidewalk	23
Accessory to larceny	16	Criminal negligence	2
Attempted burglary	4	Cutting grass without permission	5
Arson	1	Corruption of youth	1
Adultery	6	Carrying concealed weapons	3
Attempted assault	2	Conspiracy	34
Attempted robbery	4	Conspiracy to rebellion	1
Assault with intent to kill	2	Counterfeiting	4
Abandoning his cart	1	Carrying a weapon without authority	1
Assaulting an officer	1	Criminal assault	1
Attempted bribery	4	Carrying firearm without authority	1
Abduction	15	Drunk	83
Arrested on subpoena	1	Drunk and disorderly	987
Attempted murder	6	Disorderly conduct	1, 619
Accessory to theft	3	Defacing public property	14
Assault with a deadly weapon	12	Driving from the rear seat of carromata	73
Attempted incendiarism	2	Deserter from the United States Army	10
Accessory to rape	1	Disobeying an officer	77
Accessory embezzlement	1	Driving on the Escolta during prohib-	
Accessory to murder	1	ited hours	22
Awaiting warrant	1	Desertion	19
Abuse of trust	2	Detention	26
Attempted theft	2	Digging on the street without permission	1
Blocking the highway	1, 163	Destroying private property	13
Blocking a canal	87	Embezzlement	162
Burglary	12	Extortion	4
Bribery	32	Escaped prisoner	1
Brigandage	47	Escaped convict	1
Begging	9	Ear cleaning on public street	5
Bicycle without bell	1	Employing an incompetent driver	196
By request of the Philippines Constabulary	3	Fast driving	42
Bill posting without a license	1	Fast riding	26
Cruelty to animals	621	Forgery	10
Cochoero not registered	47	Fraud	5
Conducting a gambling house	256	Frustrated bribery	11
		Frustrated murder	11

Charge.	Num-ber.	Charge.	Num-ber.
Frustrated theft	1	Peddling without license	17
Frustrated criminal assault	1	Passing counterfeit money	3
Failure to deliver a parcel to its owner	4	Physical injuries	12
Falsification	3	Rape	11
Falsification of trade-mark	1	Robbery	151
False entry of dutiable merchandise	1	Refused a fare	187
Gambling	3,848	Receiving stolen goods	8
Grave physical injuries	3	Resisting an officer	31
House breaking	13	Reckless driving	22
Harness in bad repair	12	Reckless riding	1
Highway robbery	2	Refused to do duty	7
Held by order of the Prosecuting Attorney	7	Refused to pay a cochero	11
Held for the custom-house	5	Rebellion	2
Held as a witness	17	Running pawnshop without a license	1
Held by order of the Secret Service	3	Refused to be vaccinated	3
Held awaiting warrant	22	Reckless negligence	4
Held for the Detective Bureau	24	Selling without a license	35
Held for warrant	102	Selling prohibited food	1
Held for investigation	170	Selling vino to soldiers	3
Held for identification	1	Suspected of theft	2
Held on provincial warrant	11	Sedition	3
Held for the customs authorities	7	Smuggling	3
Held on request of the German consulate	1	Suspicious character	2
Held on request of the British consul	1	Suspected of murder	2
Held on warrant	9	Suspected deserter	1
Held for the Philippines Constabulary	5	Stowaway	3
Held for the Court of Customs Appeals	2	Seduction	1
Held for the Board of Health	1	Swindling	1
Held for the military authorities	1	Theft	500
Manufacturing gunpowder without license	2	Threats	2
Missappropriation of public funds	1	Threatening to kill	2
Nuisance	372	Tampering with the fire-alarm system	6
No license for vehicle	306	Trespassing	11
No light on bicycle	6	Using false name	1
Not occupying public station	801	Unlawful bill posting	1
No signal on vehicle	68	Unlawful practice of medicine	2
No lights on vehicle	67	Unlawful practice of pharmacy	5
No tariff card on vehicle	43	Unfair competition	2
No license card on vehicle	25	Unlawful slaughtering of an animal	2
No number on lamps of vehicle	8	Unlawful disposal of a dead person	1
No badge on cochero	21	Unlawful disposal of a dead animal	1
No number on vehicle	68	Unlawful smoking of opium	5
No light on cart	3	Vehicle unfit for service	45
No dog license	2	Vehicle in bad repair	5
No license for bicycle	3	Vagrancy	795
No lamps on vehicle	1	Violation of license regulation	923
No card with ratio of exchange in store	21	Violation of sanitary regulation	341
Overcharging a fare	35	Violation of excise law	67
Indecent exposure	31	Violation of building regulation	190
Illegal detention	8	Violation of barber regulation	31
Insults	1	Violation of quarantine regulation	22
Insane	29	Violation of water-supply regulation	3
Incompetent driver	3	Violation of lodging-house regulation	4
Impersonating an officer	13	Violation of park regulation	3
Interfering with an officer	10	Violation of pawnbroking regulation	5
Illegal possession of firearms	14	Violation of bill-posting regulation	2
Impersonating a secret-service officer	11	Violation of theater-exit regulation	12
Illegal marriage	1	Violation of vehicle regulation	20
Impersonating a sanitary inspector	2	Violation of explosive-storage regulation	33
Illegal measures	2	Violation of street-advertisement regulation	1
Injuring a post hydrant	4	Violation of marine-quarantine regulation	3
Infidelity in the custody of documents	1	Wanted by the military authorities	1
Keeping a vicious dog	1	Warrant from the Municipal Court	229
Larceny	457	Warrant from the Court of First Instance	34
Leper	5	Warrant from the Philippines Constabulary	2
Murder	38	Warrant from the Prosecuting Attorney	2
Manslaughter	1		
Overloading a vehicle	2		
Offense against good morals	1		
Prostitutes	6	Total	17,383

PRECINCT 1.

This precinct is commanded by Capt. Thomas F. Crowley. It comprises four stations: Parian, which is situated at No. 239 Calle Real, Intramuros; Cabildo station, 358 Calle Cabildo, Intramuros; Ermita station, 133 Calle Nueva, Ermita; Malate native station, Plaza Malate,

opposite Malate Church. Number of saloons in this precinct, 8; restaurants, 11; second-class liquor licenses, restaurants, 3; hotels, 7; barber shops, 27; groceries, 8.

There were 22 fire alarms turned in by this precinct during the fiscal year, 6 of which were extinguished by policemen without the aid of the Fire Department. There were 25 religious processions and 19 entertainments which caused extra duty to be performed by the police of this precinct; 109 reports were made by the precinct to this office regarding the dangerous condition of sidewalks, streets, and electric and telephone poles, which were considered dangerous to pedestrians and vehicles. The patrol wagon answered 371 hurry-up calls and 571 slow calls during the year to convey sick, wounded, and injured persons to hospital and prisoners to Bilibid, Municipal Court, etc. During the year a new patrol wagon arrived and is now in use by the department. It was found to be very satisfactory. The cost of this wagon was ₱1,500. The number of communications received in this precinct were: Alarms, 881; special orders, 202; circulars, 62; letters, 340. The following were promulgated in the precinct: Orders, 51; letters, 248. There are 17 police-alarm boxes in this precinct.

There were 18 runaways stopped by policemen in this precinct; 7 human corpses found, and 58 dead animals. About one-half the members of this precinct reside in the station and the remainder outside. They could all be assembled within fifteen minutes if necessity demanded.

PRECINCT 2.

This precinct is commanded by Capt. Jack Dawson. The American station is located at No. 147 Calle Anloague and native station at No. 142, same street. There are in this precinct 23 saloons, 20 restaurants, 6 pawnshops, 84 barber shops, 97 groceries, 3 hotels, a large number of dry goods establishments and gents' furnishing stores. There were 20 reports of fires sent in by policemen of this precinct, 7 of which were extinguished without the aid of the Fire Department. One hundred religious processions and other functions took place in this precinct during the year, necessitating extra duty for the police; number of reports regarding dangerous condition of streets, broken sidewalks, electric-light and telephone poles dangerous to traffic, broken water mains, sewers, 185. The patrol wagon was called 60 times by this precinct to convey sick and injured persons to the hospital. Number of communications received in this precinct were: Alarms, 881; special orders, 323; circulars, 62; letters, 85. Communications promulgated in this precinct: Letters, 522; orders, 22.

There were 10 business houses found left open and broken open in this precinct at night. There are 3 small ferries used to convey persons across the different esteros; 5 runaways were stopped by policemen in this precinct; 5 human corpses were found, and 90 dead animals. About

one-half the members of this station reside in the station, the remainder outside. If necessity demanded, they could all be assembled in about thirty minutes.

This is the most important precinct in the department, having the majority of the large business and banking houses in the city. It will be seen from the report of prisoners that this station has the majority of arrests. This is caused to a great extent by the number of Chinese gambling houses discovered and raided by the plain-clothes men of this precinct at different times.

PRECINCT 3.

This precinct is commanded by Capt. Walter E. Wilson. The first-class station is at No. 267 Calle Enrile and the second and third-class stations at No. 255 Lacoste. In this precinct there are 16 saloons, 15 restaurants, 4 pawnshops, 30 barber shops, 15 groceries, 4 hotels, 5 theaters, and 3 cinematographs. There were 25 fires reported by members of this precinct, 8 of which were extinguished without the aid of the Fire Department. Thirty-four religious processions were held necessitating the performance of extra duty by members of the precinct; 483 reports were made regarding conditions of streets, electric-light and telephone poles, etc. The patrol wagon was called by this precinct 51 times during the year to convey sick and injured to the hospital. Number of communications received in this precinct: Alarms, 881; circulars, 62; letters, 267. Letters emanating from this precinct, 332.

There were 24 runaways stopped by policemen in this precinct. About one-half of the members live inside of the station and one-half outside. It would take about eight minutes to assemble the members of the precinct if necessity demanded. There were 7 human corpses found, and 1 dead horse. The following animals were taken up on the streets and turned over to the city poundkeeper: Three carabaos, 4 deer, 4 dogs, 18 ponies, 2 pigs. There were also 12 children found who did not have any homes—8 boys and 4 girls.

There were three business houses broken open and 3 left open at night in this precinct during the year. Two ferries are used to convey passengers, one on Calle Soler across Trozo Canal, which carries about 200 passengers daily; the other on Arranque and Soler, which carries about 150 passengers daily.

PRECINCT 4.

This precinct is commanded by Capt. Mark Scott. The American station is at No. 36 Calle Bustillos and the native station at No. 39 Bustillos. There are 10 first-class bar licenses in this precinct, 48 second-class, 3 restaurant liquor licenses, 10 restaurants, and 36 barber shops. There were 10 fires reported by policemen, 6 of which were extinguished by policemen and 4 by the Fire Department. There

were 24 religious processions, 3 parades, and 14 other functions which necessitated extra duty being performed by policemen. The following were reported by policemen: Three electric-light-wire poles down, 15 streets in bad condition, 2 bridges out of repair, 8 broken sidewalks, 7 fire plugs out of order, 35 hydrants out of order, 16 bursted waterpipes, 6 sewers and drains stopped up, 135 street lights burned out, and 12 electric wires fallen. The patrol wagon was called in this precinct 25 times to convey sick and wounded to the hospital. Number of communications received in the precinct: Circulars, 62; special orders, 411; letters, 260; alarms, 881. Communications promulgated: Letters, 327; indorsements, 153; alarms, 55.

The following are the ferries in this precinct: Forty-five at Calle Nagtajan, running to Pandacan, carrying backward and forward daily about 1,350 passengers; 5 at back of San Miguel Church, Calle Malacañan, running to Santebanes, Paco, carrying backward and forward about 150 passengers daily. Number of dead bodies found, 2; dead animals, 17. The majority of the policemen in this precinct live outside of the station, but in case of necessity they could all be assembled in ten minutes.

PRECINCT 5.

This precinct is at present commanded by Lieut. Vicente Usac, and is located at No. 122 Calle Gagalangin. Number of saloons in this precinct, 1; restaurants, 1; barber shops, 40; various other industries, 1,043.

There were 9 fires reported in this precinct, 3 of which were extinguished without the aid of the Fire Department and the remainder by the Fire Department. There were 90 religious processions and other functions which necessitated extra duty being performed by policemen; 4 reports were made regarding dangerous condition of streets, bridges, etc. The patrol wagon was called 17 times to convey sick and wounded to the hospital; 204 letters were received, 881 alarms, 85 special orders, 62 circulars, and 204 letters sent. There is 1 ferry, which operates in the barrio of Balut, conveying daily about 60 passengers. Ten men of this precinct reside in the station, and it would take about forty-five minutes to assemble all members of the precinct.

PRECINCT 6.

This precinct is commanded by Capt. Joaquin Monet, and comprises two stations, one at 142 Calle Paz, Paco, and the other at No. 77 Calle Santa Maria, Santa Ana. There are in this precinct 2 saloons, 2 restaurants, 19 barber shops, 4 groceries. Three fires were reported in this precinct, 2 of which were extinguished without the aid of the Fire Department. Number of religious processions and other functions which necessitated extra duty being performed by policemen, 144; 8

streets were reported in bad condition, 3 bridges, 2 fallen electric-light poles, 4 fallen telephone poles. The patrol wagon was called 11 times to convey sick and injured to hospital. Communications received: Alarms, 881; special orders, 104; circulars, 62.

There are about 35 small boats used in conveying passengers across the River Pasig; at Pandacan, about 600 people are conveyed backward and forward daily; Santa Ana to San Felipe Neri, about 300 daily. Number of human bodies found by the police, 16; dead animals, 9.

About one-half the members of this precinct reside inside the stations and the remainder outside. In case of necessity, they could all be assembled in about forty-five minutes.

RIVER AND HARBOR PRECINCT.

This station is situated at No. 70 Calle San Fernando. There were 4 fires reported by policemen, all of which were extinguished by the Fire Department; number of processions which necessitated extra duty being performed by police, 3; number of sunken bancas and vessels reported, 56. The patrol wagon was called in this precinct 67 times to convey sick and injured to hospital. Communications received: Alarms, 881; special orders, 130; circulars, 62; letters received, 125; letters sent, 289; station orders promulgated, 20. One police-alarm box is located in the station. One business house was found broken open. Ferries in this district, 236. These ferries are operated in the Pasig River and various esteros; large bancas convey about 166 passengers daily and small bancas about 100 daily. Stolen money recovered by river and harbor police, \$132.16, United States currency; stolen property recovered, 1 trunk, containing 2 rings and 2 pairs of earrings; approximate value of property found in Pasig River and Manila Bay, about ₱2,500; number of human bodies in the estero and bay, 60; dead animals, 186. Patrolman in a rowboat covers about 10 miles during his tour of duty; the launch *George Curry*, 6 miles, and the *Buckey O'Neill*, 8 miles. About one-half the members of this precinct reside in the station, the remainder outside. It would take about twenty minutes to assemble them all in case of necessity. The launch *Buckey O'Neill* responded to 9 fires in the bay and river front. Arrests made in bay, 25; number of discharged Bilibid prisoners sent to their homes, 49; number sent to United States on Army transports, 16; number of vagrants deported to United States, 33; number deported to Hong-kong, 5; number of prisoners escorted to ships to collect fines imposed by Municipal Court, 17; prisoners sent to naval authorities, 4; to military authorities, 4; subpœnas served in bay, 54; homeless children found, 4.

DETECTIVE BUREAU.

Attached is the report covering the operations of the Secret Service Bureau for the fiscal year 1904, which contains several recommendations

made therein by Chief Trowbridge, and which are fully concurred in by me:

MANILA, P. I., July 30, 1904.

SIR: I have the honor to submit the following report of the operations of this Bureau for the fiscal year from July 1, 1903, to June 30, 1904:

I desire to invite your attention to the fact that while the number of arrests for the year just closed is much smaller than that of the year preceding, there has been no decrease in the actual work, from the fact that the cases handled for the most part have been of great importance, necessitating closer attention and more painstaking work. In other words, there have been fewer arrests by the Bureau for minor offenses, such as vagrancy, gambling, and petty larceny, and more attention has been given to important matters.

The fiscal year ended June 30, 1903, closed with a total of 1,842 arrests to the credit of the Bureau. As will be seen by the statistical table hereinafter appearing, there have been 1,457 arrests made during the year just closed. A glance at the table will show a total of 240 arrests for gambling during the year as against nearly 700 for the year ended June 30, 1903.

Arrests for the year ending June 30, 1904.

Charge.	Num-ber.	Charge.	Num-ber.
Abduction.....	11	Held for Constabulary.....	3
Accessory to theft.....	2	Held for investigation.....	9
Accessory to larceny.....	12	Held for identification.....	1
Accessory to robbery.....	14	Highway robbery.....	2
Accessory to frustrated assassination.....	6	Illegal detention of women.....	2
Accessory to conducting jueting.....	2	Illegal landing.....	7
Accessory to murder.....	1	Illegal threats.....	2
Accessory to rape.....	4	Illegal detention.....	6
Assault.....	23	Illegal marriage.....	1
Assault and battery.....	1	Illegal possession of firearms.....	12
Assault with deadly weapon.....	1	Impersonating a police officer.....	6
Assault with dangerous weapon.....	1	Interfering with police officer.....	1
Assault and destroying property.....	1	Infidelity in custody of documents.....	3
Attempted bribery of public official.....	3	Keeping tools designed to commit robbery.....	1
Attempted robbery.....	2	Larceny.....	365
Attempted murder.....	3	Murder.....	37
Agent for gambling house.....	1	Misappropriation of public funds.....	1
Begging.....	1	Order of Judge Rohde.....	1
Brigandage.....	47	Obtaining money under false pretenses.....	1
Bribery.....	9	Prostitution.....	1
Contempt of court.....	3	Practicing medicine without license.....	1
Conducting jueting game.....	1	Rape.....	6
Collector for jueting game.....	3	Robbery.....	83
Conducting gambling house.....	19	Request of Constabulary.....	2
Corruption of minors.....	1	Request of military authorities.....	1
Conspiracy.....	31	Rebellion and insurrection.....	2
Desertion.....	17	Running second-hand store without license.....	3
Desertion and breach of trust.....	1	Receiving stolen goods.....	1
Dueling.....	1	Sedition.....	2
Destroying property.....	1	Seduction.....	1
Dealer for gambling game.....	4	Suspected murder.....	1
Desertion and brigandage.....	1	Smuggling.....	5
Damage to property.....	1	Theft.....	13
Escaped convict.....	5	Trespass.....	2
Embezzlement.....	4	Threats and acts of compulsion.....	1
Estafa.....	118	Using false name.....	1
Falsification.....	8	Unfair competition.....	1
Falsification of public documents.....	2	Vagrancy.....	136
Falsification of trade-mark.....	1	Violation Ordinance 42, section 14.....	1
Falsification of revenue stamps.....	3	Violation Ordinance No. 38.....	1
Frustrated robbery.....	1	Violation liquor license ordinance.....	5
Frustrated bribery.....	2	Violation municipal ordinance.....	5
Frustrated murder.....	11	Warrant Court of First Instance.....	58
Rogery.....	5	Warrant Municipal Court.....	4
Fraud and extortion by Government official.....	4	Warrant Constabulary.....	2
False entry of dutiable merchandise.....	1	Warrant justice of the peace.....	12
Gambling.....	240	Willful entry of dwelling.....	3
Grave physical injuries.....	3		
Horse stealing.....	1		
Held as witness.....	5		
		Total.....	1,457

RECAPITULATION.

BY NATIONALITY.

Americans	101
Europeans	23
Japanese	3
Chinese	185
Natives	1, 145
Total	1, 457

BY SEX.

Males	1, 331
Females	126
Total	1, 457

Amounts of lost and stolen property and money recovered for the fiscal year ended June 30, 1904.

Month.	Property recovered.	Money recovered.	Total.
1903.			
July	P4, 127.60	P264.80	P4, 392.40
August	2, 573.13	100.00	2, 673.13
September	1, 395.30	2, 907.08	4, 302.38
October	1, 992.11	2, 084.25	4, 076.36
November	1, 637.27	983.50	2, 621.77
December	1, 780.77	1, 866.66	3, 647.43
1904.			
January	3, 047.00	100.00	3, 147.00
February	3, 633.50	168.18	3, 801.68
March	2, 622.89	20.21	2, 643.10
April	1, 394.97	1, 424.91	2, 819.88
May	2, 487.00	310.00	2, 797.00
June	5, 912.17	1, 651.22	7, 563.39
Total	32, 604.71	11, 880.81	44, 485.52

During the year there were 37 arrests on charges of murder, covering some 14 cases. Each of the cases, from the nature of things, required a large amount of work, and results have been very satisfactory.

During the year several organized bands of robbers have been broken up and their members brought to justice. These organizations are peculiar, and in nearly every instance their purpose is to stop at nothing to accomplish robbery. Their beginning usually takes place around a native wine "tienda," where Filipino loafers congregate. Some of them perhaps are ex-convicts, and these, with their stories of the ease with which money and jewelry may be obtained, induce others to join with them in their lawlessness.

The most recent instance of this kind came to the Bureau's notice in the month of May. Two spies were invited to join one of these bands, and did so, keeping detectives notified of the movements of the party. A robbery was planned to take place on Calle Lemery, Tondo, and the robbers were surprised by officers of this Bureau in the act of entering the place. One of them was killed and five captured, one of the prisoners turning out to be a criminal from Pampanga Province who was at the time wanted for robbery in that district.

During the year just closed the Bureau has handled a considerable amount of work of a political nature. The case against Dr. Dominador Gomez, the president of the Nationalist Party and "La Union Obrera," whose trial consumed over six months, required considerable attention from time to time. In the latter part of the month of December, 1903, Artemio Ricarte Vibora, a malcontent from Hong-kong, succeeded in landing in Manila and at once began organizing his new dictatorial government. Scores of persons, most of whom had been active insurgents in former days, were induced to assist in the first steps.

The Bureau began its work in this matter as soon as it was definitely known that Ricarte was here. Some forty or more ringleaders were arrested and jailed and a large amount of evidence, documentary and otherwise, secured against them. Up to this date, 24 of these have been convicted, including the one most active, and sentences have been given of from two years and \$2,000 to five years and \$4,000. The satisfactory results of the work in these cases demonstrate the almost complete impossibility of an extensive uprising, either in Manila or in the provinces. This city has always been the storm center of these political typhoons, and the least variance of sentiment or feeling of unrest is at once noted.

Under the head of recommendations in the last two annual reports, I have taken occasion to mention the necessity of some change in the law which would put the Chief and members of the Bureau on a footing in the Police Department proper. Coöperation of the uniformed police with the Bureau has been heretofore largely a matter of courtesy, and occurrences during the past year have served but to emphasize the necessity of giving the members of the Bureau a status as to authority. On one occasion during the year the Chief of the Bureau was arrested and taken to a police station by a patrolman on the street, and at another time an officer flatly refused to obey an order of his, he having received no instructions to the effect that the Chief of Secret Service had any authority. In both the instances mentioned the officers were largely in the right, inasmuch as there was no law or regulation extant covering the matter. Besides these instances there has been no great friction, but a feeling of uncertainty has always been manifest which could not but result in harm in the service. I have the honor, therefore, to make the following recommendation, which differs materially from the one of last year:

First. That the Chief of the Bureau be given the rank of inspector.

Second. That the two senior detectives, with salaries of \$2,000 and \$1,800, respectively, be given the rank of captains.

Third. That all other detectives, including natives, be given the rank of sergeants, the authority of these cases to be exercised according to the respective classes.

I further recommend that the law in reference to increase in salaries of uniformed policemen after three years' service be made applicable to the members of this Bureau. There is, in my opinion, no reason why this should not be done. The service is fully as severe and the requirements as to hours, etc., are, if anything, more so. Under existing conditions it is not reasonable to suppose that a patrolman drawing the increased salary who might be eminently qualified for this service would wish to be transferred to this department at a lower salary.

In the latter part of the month of June, in connection with the case of the murder of Chua Chong, this Office sent to the Bureau of Government Laboratories certain knives and scrapings on which were spots which were believed to be human blood. An analysis of this was absolutely imperative before further progress could be made in the case. On July 1, 1904, a bill was presented to this Office from the Bureau of Government Laboratories for ₱75 for the analysis of the blood spots, in accordance with No. 4-c scale of charges of that Bureau. It was and still is my opinion that this charge is excessive, and I believe furthermore that since the analyses which are requested from time to time have reference to very necessary Government work, no charge should be made to this Office. Murders in this city are of frequent occurrence, and in many of the cases analyses are absolutely necessary. In some cases, however, while an analysis would be of material assistance in the matter, the fact that a charge as high as the one above quoted would be entailed would cause some hesitation.

It will readily be understood that in some cases points which to a layman appear of minor importance might be the solution of a mystery, and under this head blood spots or the presence of chemicals may be brought. However, it is undesirable to go to the large expense of a chemical analysis unless the importance of its result can be preëstimated, which is difficult to be done.

Another matter closely connected with crimes of this nature is that of the attendance of a coroner or an official who is empowered to exercise the functions of a coroner. This place is now filled by the Prosecuting Attorney, *ex officio*. It is my belief that this work should come under the charge of a physician, either the police surgeon, his assistant, or some other qualified physician.

The need of some sort of a reformatory institution for young criminals, reference to which was made in last year's report, was never so great as at present. Every day from five to six boys, their ages ranging from 5 to 16 years, are brought to the office under charges of greater or less gravity. Some of these are orphans, but many are cursed with parents whose influence is of the very worst. Some of them sleep in abandoned shacks, others in river craft, and still others in doorways and under bridges. A commitment of these to prison simply means a matriculation to a crime college, the lessons being lectures from hardened criminals whose very companionship is polluting. If in place of consigning the young crooks to the baneful influence of Bilibid, they might be committed to a clean, pleasant, well-regulated industrial institution where trades would be taught and the youngsters made to feel that life had in it something beside crime and prison walls, the social atmosphere of the city would undergo a wonderful purification.

Very respectfully,

C. R. TROWBRIDGE,
Chief of Secret Service.

The CHIEF OF POLICE, Manila, P. I.

PROPERTY DIVISION.

There has been a large increase in property, in both quantity and value, during the past year. Among some of the most prominent additions are: A new buggy for the Chief of Police, which cost ₱772; 5 typewriters, costing ₱1,000; fire lines, harness, halters, etc., \$1,000; a new patrol wagon, ₱1,500; new furniture for office, consisting of desks, chairs, and file cases, ₱2,000; 800 new police Colt's revolvers, caliber .32, ₱20,780.10; and additional appliances to the Gamewell police telegraph, costing ₱37,016.

Both police launches have been extensively repaired during the fiscal year, which added greatly to their value and utility. The launch *Buckey O'Neill* was fitted with a fire pump and hose, to be used in cases of fires along the water front and among the shipping.

The necessary supplies for office to police stations, etc., have increased considerably during the year, and the clerical work in general in this division.

There have been about 250 entries of confiscated, found, and stolen property made. A large amount of this consists of ordnance property, which has been placed in this office for safe-keeping. Between March 19 and 22, 1904, 250 entries were disposed of at public auction and the

amount of \$837.77, realized from such sale, was deposited with the City Assessor and Collector April 4, 1904. In addition to this the following moneys belonging to the confiscated, found, and stolen property were also deposited with the City Assessor and Collector: April 29, 1903, \$386.46, local currency, and \$65.57, United States currency; June 20, 1904, \$63.93, local currency and \$258.50, United States currency, also ₱0.40, making a total of \$450.39, local currency, \$324.07, United States currency, and ₱838.17.

There was also turned over to the City Assessor and Collector during the first quarter of the fiscal year, which receipts emanated from the registration of cocheros, formerly conducted by this Office, \$422.48, local currency.

CITY POUND.

Since the establishing of the city pound in Manila favorable results have been obtained in the preventing of strayed animals, etc., from being a public nuisance in and around the city. It has rendered very satisfactory services, not only in recovering numerous pet animals which became lost but the receipts emanating from this source have also been considerable. Amount realized from the impounding of animals during the year, \$1,455.60, United States currency, and \$1,008.89, local currency.

There is a roundsman of the Manila police force in charge of this place, assisted by a native policeman and three laborers.

The following is a list of the employees at the public pound: Adriano Aniceto, laborer, \$180; Carlos Ermitano, laborer, \$180; Pangulinam Marcelo, laborer, \$180.

MANILA POLICE FUND.

The accounts on July 1, 1903, showed a balance on hand of \$1,745.68, local currency, and receipts for July, \$340, local currency, making a total of \$2,085.68.

This, changed to Philippine currency at the rate of \$2.13, local currency, to ₱2, Philippine currency, permission having been obtained from the Municipal Board to make this change, left a balance at beginning of August of ₱1,958.38.

The following were the receipts for the year:

August	₱218. 70
September	479. 40
October	189. 90
November	331. 80
December	531. 65
January	490. 79
February	253. 37
March	155. 63
April	535. 46
May	86. 02
June	211. 57

Making a total of ₱5,442.67, more than doubling that of the past year.

The following expenditures were made to defray funeral expenses and furnish music for civil parades, etc.:

August	P200.00
September	367.62
November	400.00
January	100.00
February	40.00
March	47.62
April	150.00
May	31.66

Total expenditures, P1,336.90, leaving a balance on hand of P4,105.77.

The increase in the Manila police fund is P2,466.15.

The larger part of this fund is kept in the Chartered Bank of India, Australia and China. There was at the close of the fiscal year in the above-mentioned bank to the credit of the police fund P4,085.54, and the remainder in charge of the storekeeper.

The present storeroom is exceedingly small and inadequate to the demands upon it for room. This is largely due to the many additions to the confiscated, found, and stolen property, which increases daily. The storeroom should have at least about 2,000 square feet of floor space, with plenty of room for shelving.

All the monthly accounts-current and quarterly property returns have been rendered to the Auditor, and same have been approved.

OFFICE FORCE.

This force is composed of 24 employees, including clerks, translators, and interpreters, one Chinese interpreter, and three messengers. There is on duty at each American station in this city a clerk with a knowledge of translating and interpreting. There have been over 15,000 communications received in this Office during the fiscal year—more than 8,000 indorsements and a similar number of letters sent.

The work in this branch has increased considerably, and in many instances the employees have been compelled to work extra, as authorized by law, without any additional compensation. The records kept are up to date, and the interest taken by each individual in the work allotted to him is commendable. At no time have complaints been made regarding the extra duty which they have been made to perform during their leisure hours.

During the early part of the year the resignation of E. I. Young, chief clerk, was accepted, and Sydney Smyth, the present chief clerk, promoted to perform the duties of this office. A high state of efficiency and discipline exists in this branch.

FIREARM PERMITS.

During the fiscal year there were issued from this office to residents of the City of Manila 580 firearm permits, 95 renewed, and 45 canceled.

DETAILED WITH BOARD OF HEALTH.

On April 22, 1904, pursuant to instructions from the Municipal Board, 14 native policemen were detailed on special duty with the Board of Health, to perform the duties of sanitary inspectors in the different districts of the city.

CHANGE OF UNIFORM.

It became necessary during the fiscal year to change the uniform of the force from blue to drab colored. The drab is thought to be more durable and adapted to this climate. The price of this uniform for patrolmen, roundsmen, and sergeants is ₱26, and for officers, ₱36. The difference in the prices of these uniforms was in the quality. The uniform used by patrolmen is of heavy, thick-threaded cloth, while that of the officers is of fine and lighter material, and almost the same color as that of the patrolmen. From the number of requests made by patrolmen, on account of the material they wore being less durable than that of the officers, it being agreeable to the men to have the cloth used by the officers, this office saw no reason why their request should not be granted, and the men all have adopted the light material, which is but ₱10 more in cost, but in the end worth ₱20 more in durability.

HORSES.

Four American horses have died during the year of glanders, also one native pony.

HEALTH OF THE DEPARTMENT.

The health of the department during the year has been excellent, there being only six deaths, as previously mentioned. The police surgeon, A. T. Short, and his assistant, Baldomero Roxas, are capable physicians, and, due to their efficiency, many cases of serious illness in the department have been prevented.

CHANGE OF OFFICE BUILDINGS.

It became necessary during the year to transfer the police headquarters, along with the other city offices, from the Municipal School to the new city hall. The offices assigned for use of this department have proved very unsatisfactory, as whenever there is a shower of rain it necessitates the removal of desks and records to any dry corner that could be located, and which is difficult to find if there is continuous rain for a day or two.

USE OF NEW REVOLVERS.

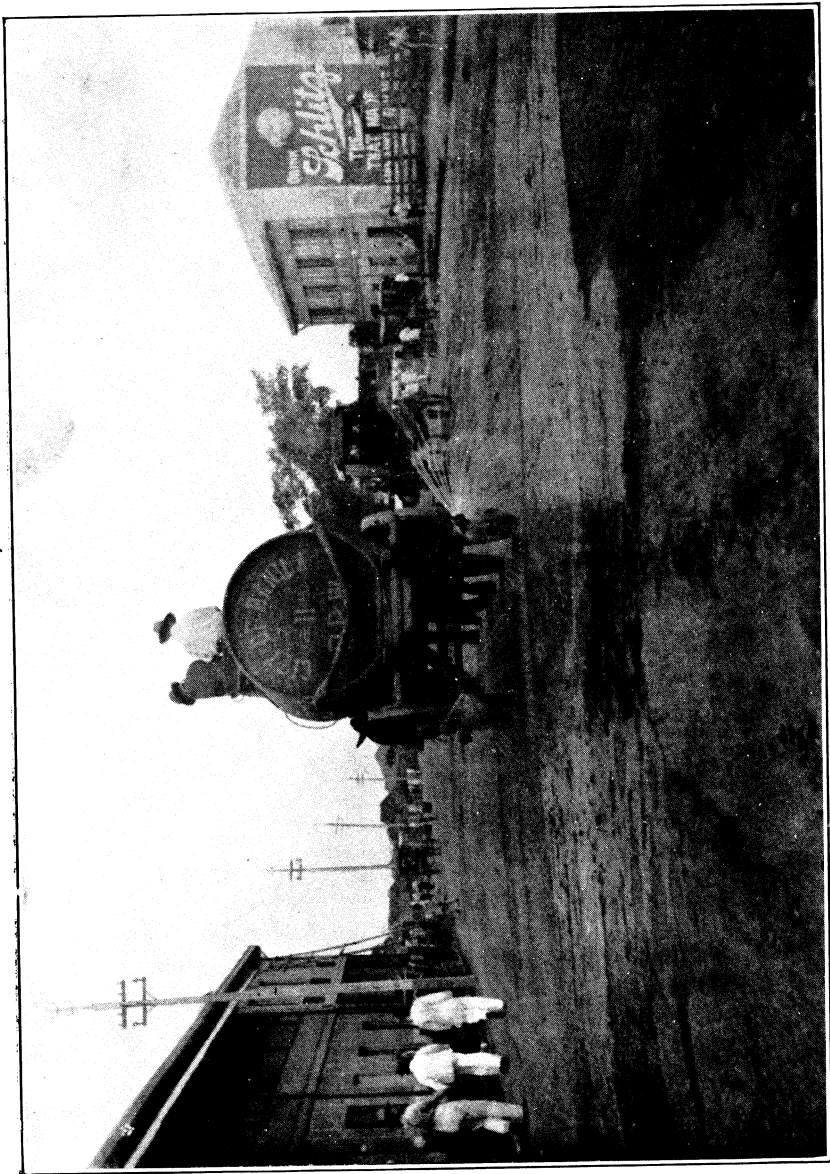
The new police revolvers, caliber .32, have proved very satisfactory, and by request from this office your honorable Board gave authority to expend \$200, United States currency, to be used in instructing the police in the art of its use. This has proved very beneficial, as policemen assigned to the department are not tested in this skill, and many men recently assigned did not know the way of using a revolver, as was shown at the practice shooting during the year. Men of this class are given special instruction, and the efficiency of the department in this line has increased about 50 per cent.

It became necessary during the year to make several recommendations to your Board regarding revocation or amendment of certain ordinances or sections of ordinances. These in most cases were given favorable consideration by your Board. I desire to tender my appreciation for the manner in which my recommendations have been considered and the many courtesies which have on many occasions been extended to me by your honorable Board.

Respectfully submitted.

J. E. HARDING,
Chief of Police.

The SECRETARY OF THE MUNICIPAL BOARD,
Manila, P. I.



STREET SPRINKLING—THE NEW WAY.

REPORT OF LAW DEPARTMENT.

OFFICE OF CITY ATTORNEY,
Manila, P. I., July 1, 1904.

SIR: I have the honor to submit the following report of the operations of the Law Department of the city of Manila for the fiscal year ended June 30, 1904:

OFFICE OF CITY ATTORNEY.

Summary of work performed.

Investigations, generally among the old Spanish Insular and municipal archives and resulting reports to the Municipal Board and the various city departments	65
Legal opinions rendered to the Municipal Board and various city departments (these are written opinions; in addition numerous oral opinions have been rendered concerning matters of current business)	133
Ordinances prepared for the action of the Municipal Board	17
Acts prepared for the action of the Philippine Commission	7
Bonds, contracts, deeds, leases, etc., prepared and submitted to the Municipal Board	85
City land titles cleared and registered	12
Suits attended to	80
Letters sent	1, 126
Letters received	857

The court work of the office has increased largely during the year, there being nearly twice as many cases pending now as upon July 1, 1903. The cases in which the office is required to appear in the Court of Land Registration are constantly increasing, many of them being of great technicality as well as of great importance to the city. The widening and opening of various streets has given rise to a large amount of legal work, including the examination of title papers, the remedying of defective titles, and the preparation of deeds for the land taken. This in many cases has necessitated the appointment of guardians to convey property belonging to minors. In such cases this office has instituted and conducted to completion proceedings of this character. There are also now pending several actions in eminent domain, involving a great deal of study and care owing to the lack of precedent for such proceedings under the present code.

The administrative work of the department arising from its supervision of the seven offices constituting the Law Department has increased materially since the last report.

At the rendering of our last report there were 29 suits in which this office appeared in its official capacity. There are now 53 actions in the various courts in which the city or its officials are parties and in which the City Attorney is required to appear. During the year 51 new cases have been begun, 12 of these being brought by the city or prosecuted on behalf of the city or the public by this office, while 39 have been instituted against the city or its officers.

The following cases have been disposed of during the year: Jaime Clotet *vs.* City of Manila et al.; dismissed at request of plaintiff without costs to the defendant. Salvador Farré *vs.* The Municipal Board; case settled and dismissed without cost to defendant. Jaime Clotet *vs.* City of Manila; suit dismissed by plaintiff without cost to defendant. Rodriguez y Lopez *vs.* City of Manila; suit dismissed by plaintiff without cost to defendant. In re Estate of Jerome L. Mudge, deceased; final report of administrator filed and approved and administrator discharged. M. Veloso y Grey *vs.* The Municipal Board; dismissed by failure to prosecute. The City of Manila *vs.* Dy Feco et al.; judgment for plaintiff for \$250, United States currency. The City of Manila *vs.* Delfin Santiago y Clemente; settled out of court. Tambunting *vs.* City of Manila; defendant's demurrer sustained and suit dismissed at the costs of plaintiff. W. S. Skidmore *vs.* The Sheriff et al.; judgment that part of goods involved be exempt; each party pay his own costs. A. S. Watson & Co., Limited, *vs.* The Sheriff; judgment for defendant against plaintiff for costs of suit. In re application of Roman Caulas to register land, opposition by city of Manila; judgment for applicant. Same in Court First Instance; appeal dismissed without costs to either party; city had no interest in land. Fred L. Dorr *vs.* The Sheriff; case dismissed at plaintiff's costs. Gabriel Schmid *vs.* The Sheriff; case dismissed at cost of plaintiff. City of Manila *vs.* Go Checo; prosecution for infraction of city ordinance; defendant acquitted. In re property August Carlson; judgment declared property to escheat to the city of Manila; paid to City Assessor and Collector. In re application Filamena Garcia et al. to register land in Paco; opposition by city of Manila; case tried; judgment for applicant; city appeals to Court First Instance. In re application Philippine Lumber and Development Company to register land; opposition by city; judgment for city of Manila for part of land. In re application of F. Basa y Mariafosque to register land; opposition by city; opposition withdrawn; city had no title. In re application of M. Dimagiula y Ignacio to register land; opposition by city; case settled by agreement; city gains by agreement. In re opposition of city to registration of land, Expediente No. 142; judgment of court that city of Manila entitled to disputed land for street purposes. In re opposition of city of Manila to registration of land, Expediente No. 137; city no interest; no cost. In re application city of Manila to register Herran Market property; judgment granting

registration of land in name of city. In re application M. Cananaan to register land; opposition by city of Manila; judgment for applicant; no costs against city. A. Blanchard, administrator, *vs.* The Sheriff; judgment for defendant. In re application of Fausto Lara y Villanueva to register land in Sampaloc; opposition by city of Manila; judgment according to plans presented by city; city gains by opposition 26.29 square meters. Corporation of San Francisco V. O. T. *vs.* A. W. Hastings, City Assessor and Collector; judgment for plaintiffs. Corporation of San Francisco V. O. T. *vs.* A. W. Hastings, City Assessor and Collector; judgment for plaintiff. Corporation of Dominicans *vs.* A. W. Hastings, Assessor and Collector; judgment for plaintiff. In re application of Forbia de la Cruz to register land in Paco; opposition by city; judgment that plans of city be taken as true and registered; city gains 20 square meters. In re application of Edward Cook to register land in Paco; opposition by city; judgment in favor of city as to the 18.30 square meters; land sold to Cook for \$50, United States currency. Francisco Suarez *vs.* J. L. Pendergast and City of Manila; suit dismissed at cost of plaintiff. Tambunting *vs.* City of Manila; judgment for defendant for costs of suit; city received ₱20.32 as attorney's fees and sheriff's costs advanced by city. In re matter of the estate of the minor children of Felipe Zamora; application of city approved and judgment entered. In re matter of Nombamiento de Tutor, Case No. 1648, Valeriana Valdegro; application approved. In re application of Mariano Reyes de la Guardia to register land in San Miguel; opposition by city; judgment for city and plan ordered recorded.

The following cases are now pending: Villar *vs.* The Municipal Board; on trial. City of Manila *vs.* Cheng Ye Chiang; on trial. City of Manila *vs.* Jacinto del Rosario; on appeal. City of Manila *vs.* Salgado; on appeal. City of Manila *vs.* Morley; pending decision of judge. Hoey *vs.* Baldwin; pending trial. Rosario *vs.* The Municipal Board; pending trial. Porcuna and Quiro *vs.* City of Manila; pending on demurrer. Padilla *vs.* The Municipal Board; pending decision on motion to quash. City of Manila *vs.* Basa; pending trial. Merchant *vs.* City of Manila; pending decision on demurrer. Button *vs.* City of Manila; on trial. Tambunting *vs.* City of Manila; on trial. Skidmore *vs.* Sheriff; on trial. Skidmore *vs.* The Sheriff; on trial. Aguado *vs.* The City of Manila; on demurrer. Abellana *vs.* The City of Manila; awaiting decision on demurrer. Barretto *vs.* The City of Manila; new trial granted. Heinszen & Co. *vs.* The Sheriff; issue not joined. The City of Manila *vs.* Gambe; on appeal. In re F. Garcia et al.; Court Land Registration; on appeal. The City of Manila *vs.* Monte de Piedad; on appeal. Tambunting *vs.* The City of Manila; on trial. In re application city to register church land in Paco; awaiting decision. Catholic Church *vs.* City Assessor and Collector; on appeal. Eugester *vs.* City of Manila; postponed by agreement. Modesto *vs.* The Sheriff;

awaiting decision on demurrer. Mission Co. of Jesus *vs.* City Assessor and Collector; pending settlement. Chang Tang Ling *vs.* City of Manila; awaiting decision on demurrer. Aramburn y Garcia *vs.* The Sheriff; on trial. Baldoré *vs.* The Sheriff; on trial. Aramburn y Garcia *vs.* The Sheriff; on trial. Encarnacion *vs.* The Sheriff; on trial. The City of Manila *vs.* Velasco; on trial. Tuason *vs.* The Sheriff; on trial. Eulogio Garcia *vs.* Sheriff; on trial. Donaldson, Sim *vs.* The Sheriff; intervention allowed. So Ychin *vs.* The Sheriff; pending trial. In re application Parish Church, Ermita; on trial. Belmonte *vs.* The City of Manila; on trial. In re opposition Joaquin Jovin; on trial. The City of Manila *vs.* Tuason; on trial. Monasterio *vs.* The Sheriff; on demurrer. Reyes *vs.* The Municipal Board; on demurrer. Lo Chin Lim *vs.* The Sheriff; on demurrer.

Aitken *vs.* The Sheriff; on trial. In re application of city of Manila to register land in Tondo; on trial. The Sheriff *vs.* Newberry et al.; on trial. The City of Manila *vs.* Rodriguez; on trial.

OFFICE OF PROSECUTING ATTORNEY.

Summary of work performed.

Investigations in relation to charges of crimes and misdemeanors	4, 134
Number of prosecutions instituted:	
In Court of First Instance	534
In the Municipal Court	801
Total	1, 335
Prosecutions in Court of First Instance:	
Cases instituted by Prosecuting Attorney's office	534
Cases brought from Municipal Court (appeals and preliminary examinations)	126
From justice of the peace, Caloocan	1
Cases pending at end of last fiscal year, including 28 cases in which defendants were not arrested	95
Total	755

Disposition of cases in Court of First Instance.

	Cases pending from last year.	Cases instituted present year.	Total.
Convictions (number of persons, 478)	44	320	364
Dismissed (including all cases in which arrests of defendants were impossible)	23	94	117
Acquittals	12	75	87
Transferred to other jurisdictions	2	6	8
Remanded to Municipal Court	1	1	1
Search warrants (no property recovered)		60	60
Search warrants (property recovered)		16	16
Committed to Insane Asylum		1	1
Cases in which no arrests have been made	12	27	39
Pending	2	60	62
Total	95	660	755

Disposition of cases in the municipal courts.

Convictions.....	564
Acquittals	148
Dismissed	24
Death of defendant.....	1
Defendants not arrested	58
Search warrants.....	6
Total.....	801
Habeas corpus cases defended	5
Coroner's inquests held.....	59
Petitions for guardianship filed	3
Number of letters received.....	715
Number of letters sent.....	443

The following changes have occurred in the personnel of this office during the fiscal year:

Mr. William J. Carr, of Wisconsin, appointed Fifth Assistant Prosecuting Attorney July 1, 1903; promoted to Fourth Assistant Prosecuting Attorney August 5, 1903. Mr. Leroy N. French, of New York, appointed Fifth Assistant Prosecuting Attorney August 7, 1903.

A comparison of the volume of business of this office during the past year with that accomplished during the year preceding it shows that in the fiscal year ended June 30, 1903, there were 472 cases instituted in the Court of First Instance, while during the fiscal year ending June 30, 1904, there were 534 cases instituted, an increase of 13.1 per cent. During the fiscal year 1903 there were 270 convictions, while in the fiscal year 1904 there were 364 convictions. In the Municipal Court during the first year mentioned there were 592 cases instituted, while during the last fiscal year there were 801 cases instituted, an increase of 35.3 per cent. In the same court during the first-mentioned year there were 279 convictions secured, while during the last fiscal year there were 560 convictions.

This report does not show the entire work of this office in the Municipal Court, as, since the appointment of Mr. French as Assistant Prosecuting Attorney, August 7, 1903, an attorney of this office has been present in that court during each session to look after and prosecute cases for violations of ordinances, police regulations, and other offenses instituted directly by the Police Department and Secret Service Bureau.

During the year there has been a steady increase in the volume of investigation conducted by this office into supposed misdemeanors and crimes, approximating in number during the year 4,134, the number of cases filed as a result of such investigations being 1,335. It will thus be seen that 32.2 per cent of investigations conducted result in prosecutions.

The steady increase in the volume of criminal business in the city of

Manila is attributed to (1) the constantly increasing efficiency of the Police Department and Secret Service Bureau, resulting in the discovery of crime and arrest of criminals where many crimes were formerly undiscovered and criminals unpunished, and (2) to the confidence of the common people in the courts of justice and prosecuting officials, the people having learned that when wronged or injured they may secure a prompt and attentive hearing of their grievances and have such wrongs and injuries promptly redressed and punished without danger to themselves. There is likewise perceptible an increasing desire on the part of the common people to disclose crime and cause the punishment of criminals, and, while formerly it was necessary to issue processes for almost all witnesses in investigations concerning crime, it is now usual for the people to appear at this office and volunteer information concerning crime and criminals. This is a most encouraging indication of an awakening of the public conscience and the realization by the people that peace and security of life and property can only result from a prompt disclosure and discovery of violations of the law and an equally prompt punishment of lawbreakers.

OFFICE OF SHERIFF OF MANILA.

The following is a detailed statement of the processes and other items which have had attention during the period mentioned in this Office:

Item.	Num-ber.	Item.	Num-ber.
Attachments	159	Orders to deposit	4
Attachments discharged	23	Orders to deliver	28
Appointments made	16	Orders to disclose	6
Accounts-current rendered	2	Order to inventory	1
Bench warrants	78	Order to render account	1
Citations, civil	1,041	Posting notices, registration of land	238
Citations, criminal	4,758	Purchase sheets prepared	6
Certificates of sale	20	Prisoners transferred	1,032
Claims filed	11	Prisoners committed	267
Executions	484	Prisoners incarcerated	198
Garnishments served	77	Prisoners released	176
Indemnity bonds taken	12	Prisoners bailed	61
Injunctions	58	Prisoner executed (garroted)	1
Inventories made	5	Reports made	19
Indorsements made	21	Requisitions passed	24
Letters written	110	Sales advertised	137
Levies raised	29	Sales made	84
Notices to Register of Deeds	64	Search warrants	49
Notifications	62	Stay of execution	10
Orders of arrest, civil	14	Summonses	2,208
Orders of arrest, criminal	912	Vouchers prepared	48
Orders of ouster	140	Writs of habeas corpus	28
Orders of sale	6	Writ of mandamus	1
Orders to show cause	31	Writs of replevin	12
Order to take possession	1	Writ of prohibition	1

The income of the office, for the period mentioned, derived from official fees, is as follows:

Collected in Philippine currency	P6,347.44
Collected in local currency	\$4,803.54

This revenue has been derived almost exclusively from civil business, an occasional fee for criminal business being paid. The criminal business of the office almost in its entirety furnished no income, while it occupies more than half the time and about two-thirds of the expense of the Sheriff's office. The transfer, commitment, incarceration, and release of prisoners requires the exclusive service of three deputy sheriffs, the maintenance of two American mules, and the use of a prison van and appurtenances, in addition to the incidental services furnished by the remainder of the force and the clerical work involved. The fees in civil cases are low, and in many cases much time is given to the execution of civil orders from which no revenue is derived—notably in executing orders of ouster, the making of levies and attachments, and the conduct of sales. Hours and sometimes days of time are consumed in these services, for which the law allows only the same fee as for serving a summons—viz, \$2.

So that, on account of the large proportion of criminal business and the low rate of fees authorized, this office is far from self-supporting, although the force and expense is kept down to the lowest limit.

The work of this office has materially increased during the last year. For example—

Item.	1902-3.	1903-4.
Citations in criminal cases	3,051	4,758
Orders of arrest, criminal cases	700	912
Search warrants	14	49
Executions in civil cases	302	484
Attachments in civil cases	80	159
Orders of ouster in civil cases	117	140
Sales advertised	62	137

And so, throughout the entire list a marked increase may be noted.

MUNICIPAL COURT OF THE CITY OF MANILA.

The wisdom of placing the entire criminal business of the city of Manila under one court has been fully and practically demonstrated. The expenses of the court are now at the minimum.

Three judges have held sessions of the court during the year—Judge James M. Liddell; Judge Alfred B. Jones; the clerk of the court, during the sickness of Judge Liddell; and Judge Frank B. Ingersoll, former Prosecuting Attorney of the city of Manila, who is now holding the same while Judge Liddell is on leave of absence.

On account of the increased work coming on the clerk of the court by reason of the consolidation of the courts it became necessary to increase his force by the addition of two assistants and a messenger, thus relieving him of much of the detail work and enabling him to expedite the work of his office with greater efficiency.

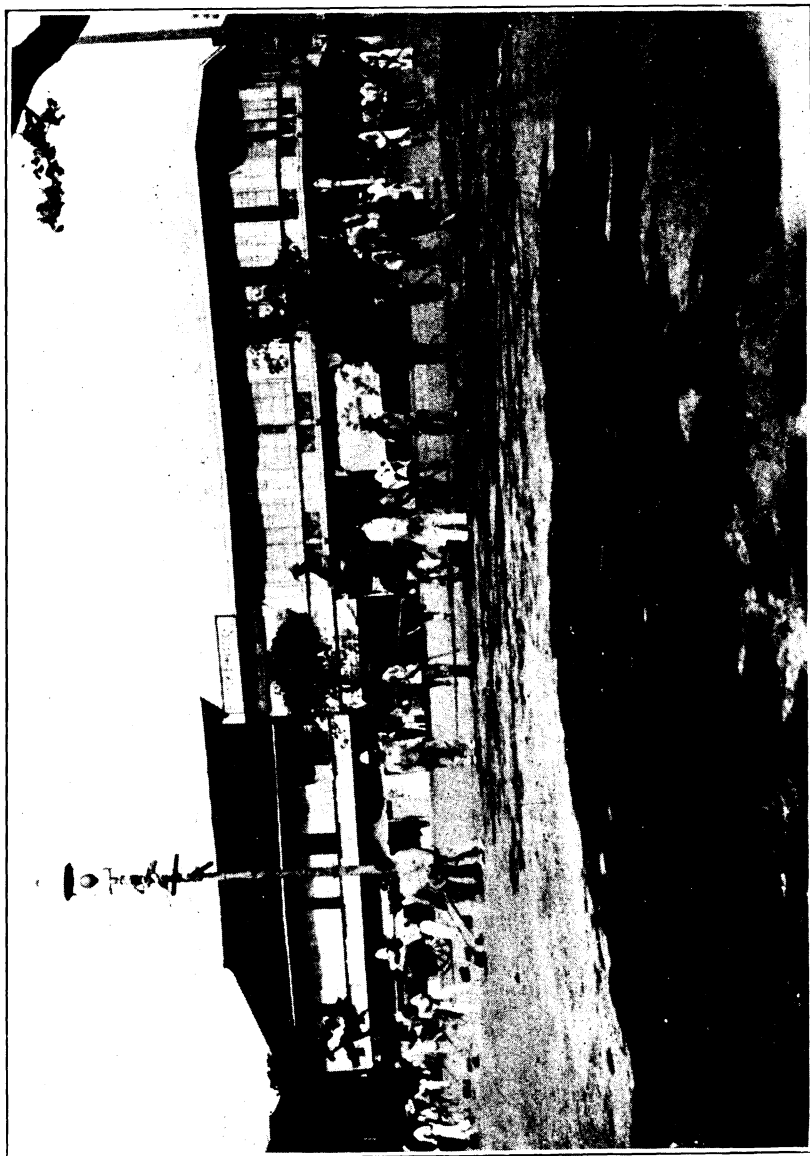
One fiscal year has passed since the consolidation, the receipts of the

court have increased some \$25,000, and the work of the court has increased about one-third over last year, as follows:

Fines, etc., for fiscal year	\$75, 274. 20
Prisoners sent to Bilibid for nonpayment of fines	2, 185
Prisoners sent to Bilibid for imprisonment	794
Prisoners sent to Bilibid for nonpayment of fines and imprisonment	131
Insane sent to Bilibid Hospital for treatment	71
Appeals to Court of First Instance	121
Number of complaints filed	16, 620
Number charged in complaints	17, 046
Number discharged	1, 925
Filipinos (males, 10,912; females, 3,457)	14, 369
Americans	684
Chinos	1, 761
Other nationalities	232

Character of offenses committed.

Charge.	Num-ber.	Charge.	Num-ber.
Cruelty to animals	588	Smoking opium without a license	5
Conducting business without a license	362	Conducting a ferry without a license	1
Assault	449	Interfering with a sanitary officer	5
Disturbing the peace	1, 075	Duress of goods	1
Letting vehicle without a license	340	Loitering about streets with a public vehicle looking for passengers	1
Gambling	3, 322	Discourtesy by a cochero of public vehicle to a passenger	1
Acting as banker in gambling game	258	Carrying excrement on canal	1
Maintaining or permitting gambling on premises	26	Cleaning excrement barrels in canal	1
Drunk	785	Cockfighting in street	23
Disorderly conduct	259	Impersonating public officer	29
Repairing and constructing houses without a license	274	Burying a body without notifying authorities	3
Driving from rear seat of vehicle	224	Neglecting to carry tariff of fare or license of vehicle in vehicle	41
Disobeying an order of inspector of Board of Health	1	Cleaning water-closets without permit	2
Neglecting to occupy a public station for public vehicle	726	Estafa	152
Peddling in prohibited districts	86	Attempt at entrance of a house without permission	1
Committing a nuisance	714	Overcharging fees for license	1
Vagrancy	1, 001	Insult	1
Obstructing street	1, 014	Injury	2
Peddling without a license	519	Driving unruly horse in street	2
Violating Manila liquor law	77	Threats	10
Employing cochero under 16 years of age	12	Accessory to larceny	14
Larceny	708	Riding a bicycle not having license	2
Neglecting to raise disc on vehicle	49	Throwing refuse into Manila Bay	4
Neglecting to wear badge for a cochero of public vehicle	45	Fast riding on bicycle	3
Leaving vehicle in street without any person in charge of same	237	Letting bicycle without license	8
Throwing refuse in canal	14	Neglecting to place number on lamps on a public vehicle	8
Refusing to take passengers in public vehicle	65	Neglecting to display lights on house at night	1
Throwing rubbish in street	40	Riding bicycle without a light	3
Attempt at bribery	66	Cutting trees on public ground without permit	4
Having gambling implements in possession	1	Obstructing Pasig River	4
Storing combustibles without permit	24	Carrying excrement through streets without permit	2
Interfering with police officer	26	Entering a house without permission	1
Obstructing canal	162	Act of compulsion	3
Disobeying a public officer	66	Refusing a cargo	1
Agent or gambling purposes	25	Frustrated larceny	5
Reckless driving	64	Smoking in theater	5
Fast driving	75	Damage to property	5
Violation vehicle ordinance	120	Digging up street without a license	1
Violation sanitary regulations	145	Neglecting to clean barber tools	44
Driving vehicle without lights	82	Reckless negligence	2
Neglecting to provide can for rubbish	126	Using for public vehicle lamps in unserviceable condition	4
Bathing at street fountain	1	Destroying and defacing public property	9
Neglecting to return property found in public vehicle	2	Attempt at larceny	1
Resisting arrest	13		



STREET CLEANING.

Character of offenses committed—Continued.

Charge.	Num-ber.	Charge.	Num-ber.
Robbery	2	Driving slow and heavy vehicles on streets at prohibited hours	7
Forgery	1	Tampering with fire alarm	6
Accessory to forgery	1	Keeping dogs without a license	1
Neglecting to properly equip theater for fire purposes	3	Permitting smoking in theater	1
Attempt at assault	4	Advertising on United States flag	2
Walking on grass	3	Refusing to be vaccinated	4
Neglecting to place number on back of public vehicle	5	Cutting grass on public grounds	8
Killing and dressing meat outside of slaughter house	1	Criminal negligence	1
Outrage	4	Carrying arms without permission	2
Trespass	3	Maintaining stores with iron shutters without locks on outside	1
Riding bicycle on sidewalk	1	Neglecting to place name of author of advertising poster on same	1
Malicious mischief	4	Seduction	2
Using unserviceable vehicle for the public service	17	Violation Ordinance 62, Section 1	1
Attempted estafa	6	Violation Ordinance 10, Section 8	16
Destroying private property	3	Playing music in street without permit	2
Riding a bicycle without a bell	1	Selling liquor within limits of United States Army post	4
Collecting for gambling purposes	13	Obstructing traffic by advertising on sidewalk	1
Contempt of court	18	Exercising business of druggist without a license	1
Duress	1	Selling poison without putting label on same	2
Using obscene and indecent language	24	Compounding drugs without being licensed	1
Carrying dead animal through the street without permit	5	Neglecting to provide rain spouts on house	1
Begging	56	Neglecting to provide register in hotel	1
Violating pawnbrokers ordinance	2		
Barbering on street	1		
Advertising without a license	15		
Obstructing bridge	2		
Unregistered cocheros	67		

OFFICE OF REGISTER OF DEEDS.

The following is a statement of the operations of the office during the fiscal year 1903-4:

Proceedings under the provisions of the mortgage law.

Inscriptions of titles	965
Titles returned for correction	60
Inscriptions denied	4
Inscriptions suspended	49
Cancellation of entry	1
Pending inscriptions	229
Total titles presented for inscription	1,299

Fees collected under the mortgage law.

In Mexican currency	\$7,438.75
In United States currency	10.66
In Philippine currency	P8,232.68

Proceedings under Land Registration Act (No. 496).

Decrees of court transcribed and original certificates of property issued	158
Conveyances of property which had already been registered and certificates issued	75
Mortgages and other contracts entered, affecting estates registered in accordance with Act No. 496	61
Entries made in the so-called mortgage book in accordance with Act No. 496	139

Fees collected under Land Registration Act (No. 496).

In Mexican currency	\$9. 29
In United States currency	\$50. 50
In Philippine currency	P1, 415. 92

JUSTICE-OF-THE-PEACE COURTS.

There has been no change in the personnel of these offices. The amount of business transacted has been substantially the same as for the preceding year, although there has been a slight increase in the receipts.

Following is a statement of the business transacted by the two courts during the year:

Suits for the recovery of sums of money	1, 050
Suits for the recovery of possession of real property	277
Suits to secure return of personal property	196
Suits for specific performance	7
Affidavits taken	33
Deposits of money received	69
Marriage certificates received	1, 626
Marriages solemnized	44
Marriage certificates registered	1, 670
Appeals taken	131
Cases settled out of court	120

Fees collected.

In local currency	\$2, 608. 43
In United States currency	\$22. 85
In Philippine currency	P2, 558. 30

Very respectfully,

MODESTO REYES,
City Attorney.

The SECRETARY OF THE MUNICIPAL BOARD,
Manila, P. I.

REPORT OF THE CHIEF OF THE FIRE DEPARTMENT.

FIRE DEPARTMENT,
Manila, P. I., August 15, 1904.

GENTLEMEN: Herewith I have the honor to submit for your consideration the annual report of the Fire Department for the fiscal year ended June 30, 1904, showing its operations during that period, together with such recommendations covering improvements that I consider necessary for the better protection of the city of Manila and its shipping interests.

PERSONNEL.

The personnel of the department shows an increase (Exhibit A) of 25 over that of the preceding year.

The clerical force has been increased by the addition of one American in the headquarters office, and the City Electrician has been given a native clerk, whose services are satisfactory.

A mechanic (horseshoer) is now employed. The horses and ponies of the Police Department as well as those of this department are shod in the shop maintained at Santa Cruz station. This permits close and immediate attention to fire horses and obviates the delays formerly experienced. In addition to shoeing, a large amount of minor blacksmithing and repair work is done. The shoeing account is as follows:

August 25, 1903, to June 30, 1904, inclusive:

Fire Department:	
American horses	411
Native horses	85
Police Department:	
American horses	158
Native horses	29

Three native linemen are now regularly employed. This is practically no increased expense, as they were formerly employed as laborers on the construction of the fire and police alarm system, their wages having been paid from the construction fund instead of from the department salary account as at present.

January 1, 1904, by Act No. 1048, the designations of the firemen were changed as follows:

Engineer (American) to engineer, first class; engineer (native) to engineer, second class; captain to foreman; lieutenant (American) to

assistant foreman; lieutenant (native), position abolished; driver (American) to fireman, first class; driver, pipeman, and truckman (native) to fireman, second class.

Of the 4 native lieutenants, whose positions were abolished, 2 were promoted to firemen, first class, and 2 reduced to firemen, second class.

The salaries of engineers and firemen by the terms of this act are made progressive, as follows:

Designation.	First year.	Second year.	Third year.	Fourth year.
Engineers:				
First class	\$1,200	\$1,300	\$1,400	
Second class	480	600		
Firemen:				
First class	900	1,000	1,080	\$1,140
Second class	240	300	330	360

Credit for previous service in the Police Department is allowed employees of these classes transferred to this department. This increase schedule has been favorably received by the employees, and its effects are already noticeable in the desire of the men to remain in the service and in good men seeking positions in this department. While some good men have left the department, the care with which new men have been selected and inefficient ones weeded out has enabled the department to be considered as in a higher grade of efficiency than ever before.

During the year the Department made 40 temporary and 56 probational appointments, 10 by reinstatement, and 4 by transfers to this department. Thirty-six employees resigned, 1 transferred, and 26 were dismissed for the good of the service. There were no deaths.

STATIONS.

The new Tanduary fire station was completed, and upon its acceptance (May 25) by the Board was immediately occupied by Chemical Engine Company No. 2 and Hook and Ladder Company No. 2, these companies abandoning the temporary structure occupied pending the erection of the new building. Engine Company No. 5 was organized and placed in service at this new station May 27, 1904, equipped with a full complement of officers and men, a second-size Metropolitan steam fire engine, a second-size hose wagon, and 2,000 feet of 2½-inch fire hose. The fuel boxes at this station are inconveniently placed and inadequate. A shed of suitable size should be built for the storage of fuel for the engine and for a sufficient quantity of coke necessary for the maintenance of the heater. The hose rack, as constructed, does not give the best service possible. It would require but a small expenditure to alter it so that hose could be quickly placed in or out and thoroughly dried.

The yard at Paco station should be filled and graded, so that the water during the wet season will not remain standing.

The hand ball court at Manila fire station is a source of great recrea-

tion to the men, but the yard is greatly in need of grading and graveling. The station could be made two stories with but a small expenditure. If the sleeping apartment of the men was located over the apparatus it would enable the companies to make a much quicker response to alarms of fire.

The new San Nicolas fire station, as arranged, has been satisfactory with but one exception. The heater is placed so far from the engine that the cost of keeping up steam is nearly double that of other stations. The heater should be placed on the apparatus floor and suitable exit for the smoke by pipe or chimney provided.

The Santa Cruz fire station is perhaps as conveniently arranged as is possible, and now that the yard in the rear has been paved it is satisfactory.

I desire to call to the attention of the Board the danger to the traveling public when the new electric railway shall be in operation. The line, as contemplated by the charter granted, will be from Plaza Santa Cruz along Calle Enrile to Calle Alcala; then along Calle Alcala in front of the Santa Cruz fire station to the narrow roadway on the northeasterly side of the station. It would appear that a block-signal system should be so arranged that in case of alarm of fire the cars leaving Plaza Santa Cruz, and also those on the roadway approaching Calle Alcala, could be stopped by automatic signals. Unless some such precaution is arranged I fear that great delay in responding to alarms from this station would be frequent, and perhaps accidents would be caused, endangering the public and doing great damage to cars as well as to apparatus of this department. I respectfully recommend that your honorable Board confer with the electric railway people regarding this danger.

The Merryweather (English) steam fire engine now held in reserve will be placed in service at the temporary Tondo fire station when same is ready for occupancy. This engine can make responses in the District of Tondo north of Calle Azcarraga with great promptness; but the district lying south of this street would be equally as quickly served by either the San Nicolas or the Santa Cruz companies. The location of these three stations is such as to leave a large triangular territory, thickly populated, cut up by numerous esteros, which are unbridged except at but few of the intersecting streets, in a greatly exposed condition. To leave the valuable water front, the Escolta, and intervening interests unprotected by a response by companies from San Nicolas and Santa Cruz stations to this Tondo District is apparently running a great risk. I therefore recommend that a new fourth-size steam fire engine be purchased and located in a new station erected in the vicinity of the city stables on Calle Azcarraga.

In accordance with the directions of your honorable Board, under date of March 28, 1904, the new Waterous gasoline fire engine recently received, together with a hose reel and other necessary equipment, was

turned over to the Bureau of Coast Guard and Transportation on a memorandum receipt. This apparatus has been placed on Engineer Island, and a fire-alarm box (No. 22) located conveniently near.

In view of the fact that that portion of the city along the pipe line on Santa Mesa Road is rapidly building up, I respectfully call to the attention of the Board the great additional protection that would be afforded by a small station located in the near vicinity of the Rotonda, Calle Alix, to accommodate this gasoline engine. This would permit two engines to respond to all that portion of the city north and east of Plaza Santa Ana without taking the engine company from Santa Cruz station.

I believe that additional fire plugs could be located on the Santa Mesa Road at comparatively small expense, owing to the close proximity of the pipe line.

At the present time two steam fire engines and one chemical answer alarms from the District of Malate. This is about a six or seven minute service from Paco and Manila stations and can not be improved upon except by the erection of a station in that vicinity.

A great many large two-story residences have recently been built, and others are in course of construction. The engine companies may be seriously retarded in their work on account of lack of ladders of sufficient length. The nearest hook-and-ladder truck is located at Tanduvay station. If a one-company station was located in the Malate District south of Calle Padre Faura, and a combination truck and chemical equipped with a 45-foot extension ladder placed in service, I would consider that district to be as well provided for as would be possible without the addition of a fire engine.

A fire boat of an improved and modern pattern is an imperative necessity for the proper protection of property on the Pasig River frontage, and the shipping in the river and bay. While the *Buckey O'Neill* would be, and has been, of valuable assistance to the department, yet its capacity is not such as to cope alone with a fire. This boat should be of such build as to be enabled to render assistance to distressed shipping in the bay in time of high seas. When the harbor improvement shall have advanced far enough to permit deep-water vessels to come to anchorage alongside warehouses, a fireboat will be an imperative requirement for the protection of the large interests that will be exposed to danger from fire.

This department requires the purchase of five more American horses to provide for the new Tondo station, and to have a sufficient number of relief horses on hand. In this connection I desire to state that of the nine mares recently received from the United States for fire use but six have proven to be entirely satisfactory. They all were too light in weight for the work required. Quite a number of the horses now in the department should be replaced by exchange for better stock, and I believe such an arrangement could be consummated upon the arrival of

new stock for the Insular Purchasing Agent or other Bureaus. While large Australian stock is sufficiently heavy for fire service, yet it is of an unwieldy, awkward draft class, unsuitable for quick service.

There have been 4,550 feet of fire hose in service since 1901 and 6,000 feet since 1902. It is to be expected that at each fire where a heavy pressure is required on the line a few lengths of hose will burst and be rendered unserviceable. There should be a quantity held in reserve, as it can not be procured under from sixty to ninety days' time. Two thousand feet are required for the new Tondo station, 2,000 for the Waterous engine, and 1,000 feet for reserve. If a new engine is purchased in accordance with the recommendation herein made, 3,000 feet of additional fire hose should be purchased, making a total of 8,000 feet of $2\frac{1}{2}$ -inch fire hose necessary.

INSPECTIONS.

There were 106 inspections made by the Chief of this department, at the request of the City Assessor and Collector, for recommendation, as follows:

For storage.	Num-ber.	For maintenance.	Num-ber.
Matches	15	Billiard table	1
Coal oil	9	Puppet shows	5
Lard	5	Music halls	1
Coal	7	Dance halls	10
Calcium carbide	3	Cinematographs	10
Lumbang oil	9	Cycloramas	1
Cocoonut oil	1	Circuses	1
Peanut oil	7	Small shows	3
Wine	1	Cigar factories	1
Miscellaneous	8	Theaters	8

The 264 storage permits under the provisions of Ordinance No. 47 cover the following:

Article.	Unit.	Quantity.	Article.	Unit.	Quantity.
Benzine	Gallons	205	Pitch	Tons	122
Calcium carbide	Pounds	2,000		Kilos	100,000
Copal	do	73,750		Gallons	600
Fireworks	Cases	1,042	Resin	Barrels	592
	Packages	150		Pounds	12,700
	Bundles	500		Gallons	25
Gasoline	Gallons	2,320		Kilos	41,500
	Drums	14	Tar, pitch	Barrels	2
Gum brea	Pounds	6,500	Tar, coal	do	239
Gum elemi	Cases	7		Tins	20
	Pounds	35,100		Kilos	140,900
Gunpowder	do	10		Gallons	750
Kerosene oil	Gallons	1,561,640		Drums	678
Naphtha	do	400	Tar, Stockholm	Gallons	300
	Drums	2,010	Turpentine	Cases	40,000
Pitch, white	Pounds	15,000		do	30
	Barrels	2		Gallons	6,445
Pitch	Bundles	59		Barrels	66
	Barrels	1,890		Drums	20

In addition 153 transportation permits have been issued. An inspection of the premises for which a permit for storage has been issued is made every ninety days.

Fourteen convictions under Ordinance No. 47 were obtained, as per Exhibit B.

Monthly inspections of fireplugs and street hydrants are made by the commanding officers of the various companies in their respective districts, and those found in need of repairs are immediately reported to the superintendent of water supply and sewers, who has been very prompt in his attendance to them.

The only theater wherein smoking is permitted in the auditorium is the Orpheum on Calle Echague, conducted by Messrs. Jones & Levy. Smoking is permitted in the promenade portion of the Grand Opera House on Calle Cervantes, conducted by Hashim Brothers. In all other theaters and places of amusement smoking is prohibited.

Ordinance No. 58, regulating the use of iron, steel, and metal shutters, blinds and doors, has been enforced, and at the present time no violations exist.

There have been no violations of Ordinance No. 33 for the prevention of fires in the drying rooms of factories.

Inspections under Ordinance No. 36, the issuing of permits for electrical installations, the collecting of fees for same, etc., are under the supervision of the City Electrician, whose report is transmitted herewith and made a part hereof. (Exhibit I.)

A report of fires (Exhibit C) and operations of companies (Exhibit D) is transmitted herewith and fully covers all the data that can be obtained. The officers of this department have made earnest and persistent efforts to obtain insurance statistics in order to procure more fully the actual losses sustained, but have not met with success.

While the city ordinances permit the apparatus of this department the right of way over all other street vehicles, yet the drivers of apparatus are held strictly accountable for accidents or injury to private property. There have been but few instances of collisions with other vehicles, and these have been amicably adjusted without recourse to judicial or official action.

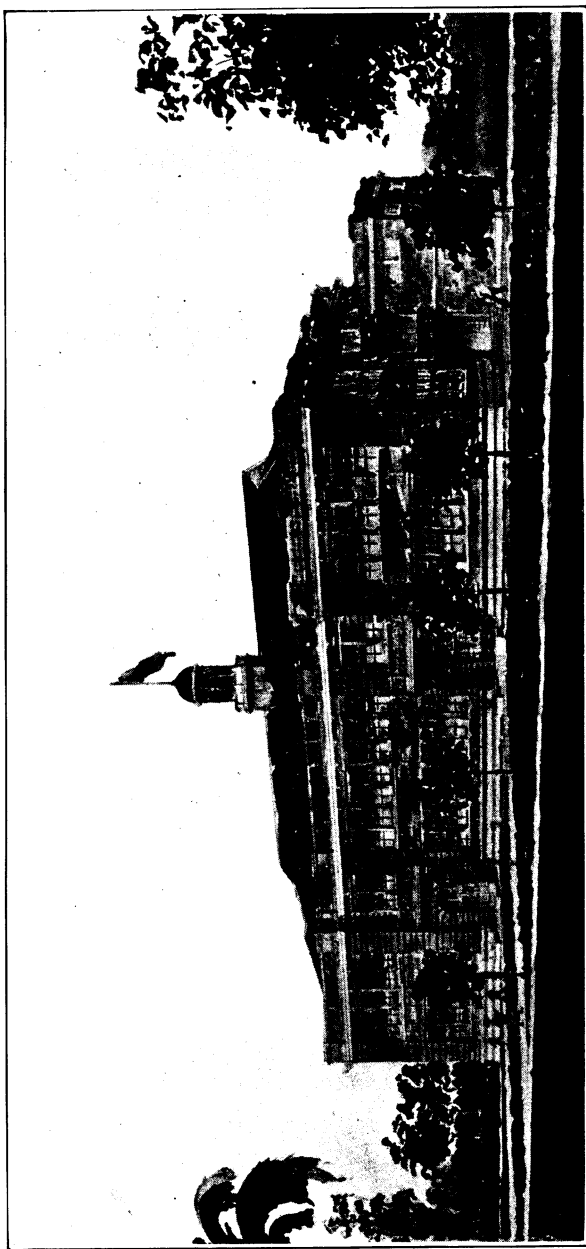
CASUALTIES AT FIRES DURING THE FISCAL YEAR.

September 29, 1903, Fireman Frank W. Schenck was slightly injured by breaking through ceiling and falling across a beam while working with a line over Till's Studio, Escolta, Binondo District.

October 2, 1903, two natives burned severely by alcohol becoming ignited; fire at No. 79 Calle Tanduay, Quiapo District, distilling plant of Ynchausti & Co.

October 24, 1903, a Chinese was slightly burned on arm; fire at No. 9 Ylang Ylang, District San Nicolas.

October 26, 1903, Fireman Walter C. Booth was overcome by smoke and sent to the Civil Hospital; fire at Nos. 3-11 Calle Lara, San Nicolas District.



DRAWING OF SCHOOL BUILDING.

February 10, 1904, native had foot slightly cut by broken glass; fire at No. 53 Calle Elizondo, Quiapo District.

February 16, 1904, at 4.08 a. m., at Insular Cold Storage and Ice Plant, Foreman Cuff, Assistant Foremen Wynne and Brown, and Firemen Antikoll, Lorenzo, Policarpio, Weed, Sanford, Cease, Schramm, Pearce, and Blake were overcome by smoke and fumes and taken to the Civil Hospital. Many other officers and firemen were overcome and carried into the Botanical Gardens for relief and rest. At 9.17 a. m. the following were taken to the Civil Hospital on account of suffocation: Foreman Cuff, Foreman Black, Assistant Foremen Bowers, Wynne, and Brown, Firemen Antikoll, Discipulo, Tiantes, Pearce, Schramm, Blake, Balisnao, and Linsao. This fire was under the control of Deputy Chief Hoey, Chief Bonner having been absent from the city.

March 5, 1904, Vicente Martinez, 11 years of age, servant, was burned to death by ignition of can of gasoline. Presence of boy was not known until too late to render assistance. Fire at No. 28 Calle San Jose, District of Ermita.

March 7, 1904, Carmen Camilo, insane native woman, was burned to death in a fire which originated at No. 263 Calle Gagalangin, District of Tondo. This fire consumed about twenty native shacks, and the woman was unable to escape. Her presence was unknown to the department until the corpse was exposed.

June 21, 1904, Ricardo Garcia, employee of Erlanger & Galinger, was burned on hand by explosion of naphtha; fire at Nos. 108-110 Calle Carriedo, Quiapo District.

I think it but just to the officers of the Philippine Civil Hospital to state that firemen have at all times been promptly admitted and immediate attention has been given them. As yet no complaint to this office has been made by firemen, and I am thoroughly convinced that they have received the best of care while in that institution.

I fully concur in the previous recommendation of Chief Bonner that steam engineers operating boilers within the city limits be licensed when found competent, and that boilers be subjected to a rigid inspection periodically.

The causes of fires and alarms are submitted herewith (Exhibit E), with a statement of how the buildings were occupied (Exhibit F).

Appropriations for the support of the department during the year were as follows:

Authority.	Salaries.	Equip- ment.	Contingent expenses.
Act No. 795.....		P3, 923. 86	P31. 00
Act No. 804.....	P85, 000. 00	46, 000. 00	13, 000. 00
Act No. 1048.....	90, 000. 00	70, 000. 00	23, 051. 00
Act No. 1167.....	10, 462. 97	5, 999. 43	
Total.....	185, 462. 97	125, 923. 29	36, 082. 00

Grand total, P347, 468. 26.

24305—17

The total expenses for the year were ₱300,562.11, detailed as per Exhibit G.

The apparatus, equipment, horses, and hose now in service are shown in detail as per Exhibit H.

In conclusion, I thank your honorable board, and especially Capt. C. H. Sleeper, member in charge of the affairs of this department, for the assistance given me in the discharge of my duty, and for the hearty coöperation that has made it possible to bring the department to its present state of efficiency. I wish also to thank the Police Department for its courteous treatment and assistance rendered at fires.

Respectfully submitted.

LEWIS H. DINGMAN,
Acting Chief of Department.

The MUNICIPAL BOARD,
Manila, P. I.

EXHIBIT A.—*Personnel of the Fire Department.*

Designation.	Number.	Designation.	Number.
Chief (headquarters)	1	Foremen	8
Deputy chief (headquarters)	1	Assistant foremen	7
Chief engineer (headquarters)	1	Engineers:	
Clerks (headquarters)	3	First class	3
Mechanic (headquarters)	1	Second class	3
City electrician	1	Firemen:	
Assistant city electrician	1	First class	27
Clerk (native)	1	Second class	29
Linemen:			
American	3	Total (Americans, 56; na-	
Native	3	tives, 37)	93

EXHIBIT B.—*Convictions obtained during the fiscal year 1904 for violations of Ordinance No. 47.*

Date.	Name.	Street.	Fine. ¹
Apr. 4	Ny Tenco	222 Santo Cristo, San Nicolas	\$50
Apr. 6	Tamtang	12 Villalobos, Quiapo	50
Apr. 19	Tin Fam Co	do	100
Apr. 27	Ong Tain Co	42 Nueva, Binondo	25
Do...	Yu Cay Co	51 Nueva, Binondo	25
Do...	Ong Tiong	14 Arraque, Santa Cruz	25
Do...	Sy Bun Meng	151 Rosario, Binondo	50
Apr. 28	Siy Young Cheng	213 Jaboneros, San Nicolas	50
Apr. 29	Cheng Queng Po	17 Hormiga, Binondo	50
Do...	Ny Bim Biao	Calle Rosario, Binondo	50
May 11	Jacinto Diy Quimsay	56a Santo Cristo, San Nicolas	25
Do...	Ong Cheng	70 Santo Cristo, San Nicolas	25
May 13	Jose Y. Lopez	278 Cabildo, Intramuros	10
May 24	Sy Bio Siong	199 Aceiteros, Tondo	25
	Total		560

¹ United States currency.

EXHIBIT C.—Detailed statement of fires

No.	Date.	Alarm received.		Location.	District.
		Time.	Box No.		
1	1903. July 4	5.15 a. m.	82	9 Gunao	Quiapo
2	July 13		(*)	S. S. Beechley	
3	July 15	2.32 a. m.	41	130 Aceiteros	San Nicolas
4	July 22	7.45 p. m.	(*)	285 San Sebastian	Quiapo
5	July 26	10.00 p. m.	(*)	88 Numancia	San Nicolas
6	July 23	5.00 a. m.	(*)	Depot Quartermaster, Office	do
7	July 30	4.00 p. m.	(*)	Land-transportation corral	do
8	Aug. 13	7.29 p. m.	15	S. S. Montanez	Binondo
9	Aug. 21	9.14 p. m.	241	455 Real	Malate
10	Aug. 28	1.45 p. m.	14	95 Escolta	Binondo
11	do	4.07 p. m.	62	791 Iris	Quiapo
12	Aug. 31	6.48 p. m.	(*)	50 Dulumbayan	Santa Cruz
13	Sept. 2	8.24 a. m.	62	791 Iris	Quiapo
14	Sept. 10	7.30 p. m.	(*)	Front Zorrilla Theater	Santa Cruz
15	do	3.45 p. m.	(*)	181 Solana	Intramuros
16	do	4.05 p. m.	145	185 Real	do
17	Sept. 21		(*)	114 Anda	do
18	Sept. 24	7.40 p. m.	(*)	San Marcelino and Concepcion	Ermita
19	Sept. 27	10.10 a. m.	(*)	Cervantes	Santa Cruz
20	Sept. 29	5.54 p. m.	57	San Pedro and Centeno	do
21	do	5.48 p. m.	14	105 Escolta	Binondo
22	Sept. 28	3.48 p. m.	(*)	157 Rosario	do
23	Oct. 2	10.00 a. m.	(*)	79 Tanduary (Interior)	Quiapo
24	Oct. 3	10.42 p. m.	14	83 Escolta	Binondo
25	Oct. 10	9.40 p. m.	(*)	252 Bilibid	Quiapo
26	do	9.48 a. m.	135	206 Palacio	Intramuros
27	Oct. 11	9.30 a. m.	143	Isabella II Gate	do
28	Oct. 15	7.00 a. m.	15	2 Escolta	Binondo
29	Oct. 18	4.45 p. m.	(*)	S. S. Kodat	San Nicolas
30	Oct. 19	6.57 p. m.	35	167 Madrid	do
31	Oct. 22	7.08 p. m.	21	103 Arranque	Santa Cruz
32	Oct. 24	12.10 a. m.	27	9 Ylang Ylang	San Nicolas
33	Oct. 26	5.07 p. m.	34	3 Lara	do
34	Oct. 29	10.30 a. m.	(*)	Custom-house	do
35	Oct. 30	10.45 a. m.	(*)	do	do
36	Nov. 6	5.58 p. m.	35	152 Madrid	do
37	Nov. 13	1.10 p. m.	165	48 Penafrancia	Paco
38	Nov. 12	5.40 p. m.	(*)	143 Cabildo	Intramuros
39	Nov. 16	12.10 p. m.	236	86 Herran	Paco
40	Nov. 14	5.56 p. m.	61	540 Bilibid	Santa Cruz
41	Nov. 23	8.30 p. m.	(*)	11 Magallanes	Intramuros
42	Nov. 5	10.00 a. m.	(*)	Rotonda Aqueduct	Sampaloc
43	Dec. 3	5.21 p. m.	83	Castillejos and Duque de Alba	Quiapo
44	Dec. 6	10.25 a. m.	126	317 Salinas	Tondo
45	Dec. 12	6.10 p. m.	(*)	22 Dasmarinas	Binondo
46	Dec. 18	7.57 p. m.	135	19 Basco	Intramuros
47	Dec. 22	7.44 p. m.	76	General Solano and San Miguel	San Miguel
48	Dec. 24	9.15 p. m.	83	64 Castillejos (Interior)	Quiapo
49	Dec. 27	4.39 a. m.	65	17 Manrique	Sampaloc
50	Dec. 29	5.30 p. m.	(*)	49 Soledad	Binondo

*Received verbally.

*Extended to 11 Lara, 17 and 25 Valderrama.

that occurred during the fiscal year 1904.

Occupant.	Description.	How occupied.	Cause of fire.	Damage to buildings and contents.
Lucilio Ramirez	Stone and brick	Dwelling	Fire works through window.	₱6
		Coal boat	Spontaneous combustion.	30
Chinese and natives	Frame and stone	Canteen and tenement.	Unknown	6,000
Sakemiller & Domas	Frame	Saloon and dwelling	Swinging lamp dropped	
Wong Sang Wo	Brick	Laundry	Lamp upset	
Depot Quartermaster.	Frame	Office and warehouse	Cigar in sawdust cupboard.	2
Quartermaster Department.	do	Veterinary hospital	Spark from forge	2
Gutierrez Bros		Freight and passenger boat.	Heat from auxiliary boiler.	20
Mrs. W. D. Latimer	Wood and nipa	Dwelling	Lamp explosion	20
Emilio Brammer	Stone	Tailor shop	Unknown	30,000
Civil Hospital Laboratory.	Frame	Shed for heater	Overheated flue.	4
Escolar Association.	Stone and frame		Lamp fell	
Bureau Government Laboratories.	Frame	Shed for gas machine	Gasoline explosion	200
Dr. R. P. Strong		Automobile	Leak in gasoline tank	2,800
La Palma de Mallorca.	Frame	Hotel and bakery	False alarm	
Loren Cheever	do	Confectionery	Gasoline explosion	20
M. de la Cruz	Stone	Millinery store	Lamp explosion	
			Order to pump out water.	
Insular Government.	Stone	Hospital for lepers	Lamp explosion	
			False alarm	
Till's Studio	Wood and iron	Photograph gallery	Collision explosion	22,400
Sy Bim Bim	Brick and stone	Chinese store	Carelessness with matches.	
Ynchausti & Co.	Frame and stone	Distilling plant	Explosion of alcohol	
Stahl & Rumker	Wood and stone	Drug store	Boiler ignited rubbish	4
P. Polifranco	Wood	Dwelling	Overturned lamp	
Mrs. A. Speiler	Stone and wood	Boarding house	Stove improperly connected.	10
City of Manila	Stone	Storehouse	Overturned tar kettle	
M. A. Clark	Wood and stone	Confectionery	Boxes near stovepipe	
		Cargo boat	Spontaneous combustion.	
B. de Jesus	Nipa	Dwelling	Overturned lamp	
D. G. Socu	Wood	do	Overturned kerosene can.	
Tong Yeng Co	Frame and brick	Restaurant	Defective flue	
Macleod & Co.	Stone and iron	Warehouse	Hemp ignited	152,000
Insular Government.	Warehouse "O"	Stone	Careless handling of matches.	40
do	Stone	Warehouse	do	80
Gabriel Santos	Wood	Tailor shop	Lamp explosion	
S. G. Epperly	Nipa	Dwelling	Overturned stove	
Thos. Newirth	Stone and wood	Hotel	Overturned lamp	
C. S. Smith	Brick and wood	Dwelling	Turpentine explosion	
Ki Si	Wood	Store	Overturned lamp	
Geraldo Urbina	Stone and wood	Dwelling	Dropped lamp	
			Ordered to pump out water.	
Philippine Land and Development Co.	Wood	Sawmill	Flue blown out	
Evaristo Ranjo	Stone and wood	Dwelling	Clothing ignited	330
Ting Snipley	do	Box factory	Grease on fireplace	
John Fleming	do	Dwelling	Overturned lamp	
			False alarm	
Benito Mojico	Wood and bamboo.	Tenement house	Lighted candle to house	800
Me Yaki	Brick and wood	Dwelling	Lamp explosion	
Macondray & Van Buskirk, contractors.	Wood		Chimney burned out	8

* Extended to two small nipa shacks which were totally destroyed; loss, ₱50.

EXHIBIT C.—Detailed statement of fires that

No.	Date.	Alarm received.		Location.	District
		Time.	Box No.		
	1904.				
51	Jan. 2	3.27 p. m.	37	83 Estero Binondo	San Nicolas
52	Jan. 3		(*)	33 Plaza Goiti	Santa Cruz
53	do	6.30 p. m.	71	144 Balic Balic	Sampaloc
54	Jan. 5	12.15 a. m.	163	6 Nozaleda (Interior)	Ermita
55	Jan. 12	12.53 p. m.	81	35 Padre Ducos	Quiapo
56	Jan. 17	7.10 p. m.	45	61 Padre Rada ^b	Tondo
57	Feb. 10	2.35 p. m.	243	Outside city limits	Pasay
58	do	7.57 p. m.	82	53 Elizondo	Quiapo
59	Feb. 16	10.10 p. m.	(*)	Plaza Carmen	do
60	do	4.08 a. m.	152	Insular Cold Storage and Ice Plant	Ermita
61	do	9.17 a. m.	152	do	do
62	Feb. 18	5.02 p. m.	(*)	do	do
63	Feb. 19	11.30 a. m.	(*)	48 San Agustin	Intramuros
64	Feb. 22	3.54 p. m.	231	129 Padre Faura ^c	Ermita
65	Mar. 1	3.01 p. m.	145	154 Real	Intramuros
66	Mar. 4	9.53 p. m.	(*)	50 Sevilla	San Nicolas
67	Mar. 5	3.24 p. m.	125	478 Santa Mesa Road (Interior)	Santa Mesa
68	Mar. 5	6.55 p. m.	(*)	28 San Jose	Ermita
69	Mar. 7	11.40 a. m.	27	101 San Fernando	San Nicolas
70	do	4.01 p. m.	(*)	263 Gagalangin ^d	Tondo
71	Mar. 12	3.20 p. m.	(*)	End of Isaac Peral	Ermita
72	do	6.54 p. m.	232	29 San Jose	do
73	Mar. 15	8.20 p. m.	(*)	18 Alcala (Interior)	Santa Cruz
74	Mar. 17	6.39 p. m.	36	194 Lavezares	San Nicolas
75	Mar. 19	3.02 a. m.	71	65 Guipit ^e	Sampaloc
76	Mar. 20	2.00 a. m.	(*)	511 Santa Mesa	do
77	Mar. 19	6.50 p. m.	64	62 Gastambide	do
78	Apr. 3	6.16 a. m.	243	472 Nueva	Malate
79	do	4.50 p. m.	(*)	11 Alcala	Santa Cruz
80	Apr. 4	7.09 p. m.	135	146 Santa Lucia	Intramuros
81	Apr. 5	9.30 p. m.	12	24 Isla de Romero	Quiapo
82	Apr. 11	3.43 a. m.	41	195 Estero Binondo ^f	San Nicolas
83	Apr. 18	5.45 p. m.	(*)	Custom-house	do
84	Apr. 21	2.06 p. m.	54	343 Timbugan ^g	Santa Cruz
85	do	8.00 a. m.	(*)	103 Gagalangin	Tondo
86	Apr. 29	9.58 p. m.	13	98 Escolta ^h	Binondo
87	Apr. 30	7.52 p. m.	27	97 San Fernando	San Nicolas
88	May 3	11.30 p. m.	(*)	325 Magdalena (rear)	Santa Cruz
89	May 6	4.06 p. m.	237	24 Barredo (Interior) ⁱ	Malate
90	May 9	7.00 p. m.	(*)	Sinagoga (Interior)	do
91	May 11	5.40 p. m.	(*)	101 Real	Intramuros
92	May 15	7.25 p. m.	236	159 Nueva	Malate
93	May 16	1.10 p. m.	(*)	338 Nueva	do
94	May 20	7.54 p. m.	12	5 Quiotan	Santa Cruz
95	May 21	3.37 p. m.	237	349 Real ^j	Malate
96	May 24	2.56 a. m.	14	62 Escolta ^k	Binondo
97	June 14	7.50 a. m.	(*)	19 Espeleta (Interior)	Santa Cruz
98	June 20	2.30 a. m.	71	145 Balic Balic	Sampaloc
99	June 21	4.07 p. m.	85	108 Carriedo	Quiapo
100	June 23	5.30 a. m.	31	Custom-house	San Nicolas
101	June 27	9.59 p. m.	23	81 Sacristia	Binondo

* Received verbally.

^b Extended to rear of building, 2 small nipa shacks; to 84 Albuquerque, two small nipa shacks; loss, ₱350.

^c Extended to 137 Padre Faura, Ermita. Total loss; value, ₱400.

^d Extended to 20 nipa shacks, totally destroyed; loss, ₱3,000.

^e Extended to small shack in rear, Nos. 67-69 and 68 Guipit, 49 Guipit and 122 San Roque; loss, ₱5,000.

occurred during the fiscal year 1904—Continued.

Occupant.	Description.	How occupied.	Cause of fire.	Damage to buildings and contents.
Legoria Sequiton	Stone and wood	Warehouse	Cocoanut shells ignited	₱20
A. Castillo		Store	Lamp explosion	
Marie Gonzales	Nipa	House of ill fame	do	
Colonel Chamberlain.	Wood	Servants' quarters	Lighted candle to paper	
Lim Tico	Stone and wood	Dwelling	Lamp to clothing	
P. Gonzalbo	Nipa	do	Lantern to house	750
United States Army		Barracks	Overturned lamp	
F. de los Santos	Stone and wood	Dwelling	do	
Jose Gimenez	Galvanized iron	Place of amusement	Cinematograph tape ignited.	560
Insular Government.	Stone and brick	Ice plant	Charcoal burned into floor.	200
do	do	do	do	200
do	do	do	Ordered to chop out flooring.	
Ah Hong	Stone and wood	Laundry	Defective flue	
D. Mardenayar	Nipa	Carriage factory	Spark from forge	1,400
Juan Galmes	Stone and wood	Bakery	Rubbish on oven	300
C. F. Garry	Frame	Dwelling	Lighted candle to wall	2
F. Alverto	Nipa	do	Flatiron to wall	10
Jose Pozas	Brick and wood	do	Gasoline explosion	3,800
Juan Jimenez	Stone and wood	Drug store	Ether explosion	2,600
Miguel Gueverra	Nipa	Dwelling	Spark from steam roller	300
City of Manila	Dumping ground		Spontaneous combustion.	
E. M. Barton	Wood	Bay View Hotel	False alarm	
Civilo Ronquillo	do	Dwelling	Overturned lamp	
Yan Sy	Stone and wood	do	do	
Felix Amper	Wood and nipa	do	Lamp left lit after retiring.	500
Kobago	Nipa	Store	Unknown	
F. Richter	Wood	Residence	Chimney burned out	
Joe Finch	Nipa	do	Overturned lamp	400
City of Manila	Wood	Fire Department, blacksmith shop.	Rubbish ignited by match, cigar, or cigarette.	10
Maria Garcia	Stone and wood	Dwelling	Chimney burned out	
B. de Garcia	do	do	Lamp explosion	2
Chino (unknown)	do	Bakery	Wood near oven	69,770
Insular Government.	Wood	Office	Cigarette in rubbish	10
Jose Munoz	Wood and nipa	Dwelling	Stove to side of house	700
Francisco Sandin	Nipa	do	Lighted cigarette to house.	
Llavore and Tuyet	Brick and wood	Merchandise store	Unknown	54,000
Lee Voo	Stone	Dwelling	Overturned lamp	
Sotero Villezo	Nipa	do	Incendiary	
P. Alonzo	do	do	Unknown	400
V. Santos	do	Cigar factory	do	3
Joe Heery	Stone and wood	Saloon and billiard hall.	Gasoline explosion (lamp).	30
Mrs. Shattuck	Wood	Dwelling	Lamp explosion	100
Lodia Trimalo	Frame and nipa	do	Unknown	3
Antonio Oliveros	Stone and wood	Dentist parlor	Lamp explosion	5
C. B. Williams	Brick and wood	Dwelling	Defective electric wiring.	44,000
Dhuman, Chillaram Co.	Stone and wood	Dry goods store	Unknown	6,000
Filomena Andres	do	Dwelling	do	20
Juan Atarde	Brick and wood	House of ill fame	Overturned lamp	30
Erlanger & Galinger.	Stone and wood	Merchandise store	Naphtha explosion	80
Insular Government.	do	Custom-house	Lighted match or cigarette.	275
L. J. Bunnan	do	Cigarette factory	Chimney burned out	

^c Extended to 173 and 199-201 Estero Binondo, 5-31 Mercado. Damage included in above.

^e Extended to 44 houses adjoining Timbugan, Cervantes, Mayhaligue, and Requesen; loss, ₱5,500.

^b Extended to 104 Escolta and 21 Pasage de Perez, Wassiamull, Assomull & Co., Indian Bazaar; loss ₱53,000.

ⁱ Extended to two nipa shacks, 26-28 Barredo. Total loss; value, ₱300.

^j Extended to 350 Real, nipa shack; loss ₱5.

^k Extended to El Sport, 58 Escolta, and Grossman, 64 Escolta, upstairs; loss, ₱250.

EXHIBIT D.

Summary of fire service, by companies, for the fiscal year 1904.

Company.	Alarms answered.	Fires fought.	Miles traveled.	Work performed.	Time worked.	Time out of quarters.
Engine Company—					<i>h. m.</i>	<i>h. m.</i>
No. 1	29	19	39½	18,950	46 9	51 50
No. 2	51	20	91½	12,700	33 46	50 44
No. 3	17	12	37½	15,300	31 46	37 23
No. 4	16	11	29½	13,650	21 18	29 36
No. 5	2		2½			48
Chemical Engine Company—						
No. 1	14	11	12	2800	8 18	12 54
No. 2	20	6	26½	2720	2 36	10 56
No. 3	12	3	23½	2320	4 5	9 11
No. 4	20	11	24½	2880	16 0	24 43
Hook and Ladder Company—						
No. 1	25	17	33½	3656	37 2	42 31
No. 2	31	16	62½	3218	20 39	33 9
Total	237	126	384½		221 39	303 45

¹ Number feet hose laid. ² Number gallons chemical used. ³ Number feet ladders raised.

Number feet of hose laid	30,600
Number gallons chemical used	2,720
Number feet ladders raised	874

Monthly summary of fire service for the fiscal year 1904.

Month.	Number of alarms.	Miles traveled.	Time worked.	Number of feet hose laid.	Number of feet ladders raised.	Number of gallons chemical used.
1903.			<i>h. m.</i>			
July	7	10½	13 51	1,750	38	
August	5	19½	8 11	2,250	78	240
September	10	32½	13 3	1,950	78	160
October	13	40½	35 19	1,850	108	240
November	7	18½	2 50	150		
December	8	31	4 50	2,050	50	320
1904.						
January	6	30	3 55	2,050	20	160
February	8	26½	39 48	2,000	50	160
March	13	52½	13 13	3,100	166	560
April	10	72	69 45	9,200	254	400
May	9	35½	14 48	3,300	32	240
June	5	15½	2 6	950		240
Total	101	384½	221 39	30,600	874	2,720

EXHIBIT E.—*Causes of fires and alarms.*

Cause.	Number.	Cause.	Number.
Boiler igniting adjoining rubbish	1	Explosion of gasoline in lamp	1
Chimneys burning out	4	Fireworks shot through window	1
Cocoonut shells ignited	1	False alarms	4
Cinematograph tape ignited	1	Flue blown out	1
Charcoal burning into floor	3	Grease on fireplace	1
Charcoal flatiron igniting wall	1	Heat from auxiliary boiler	1
Defective flues	2	Hemp ignited	1
Defective electric wiring	1	Incendary	1
Explosions of gasoline	4	Lighted cigar in "sawdust" cuspidor	1
Explosion of collodion	1	Lamp explosions	10
Explosion of alcohol	1	Lighted cigar, cigarette, or match setting	
Explosion of turpentine	1	fire to house	6
Explosion of ether	1	Lighted candle igniting house	1

EXHIBIT E.—*Causes of fires and alarms*—Continued.

Cause.	Num-ber.	Cause.	Num-ber.
Lighted candle igniting paper	1	Oven igniting adjoining wood	1
Lantern igniting house	1	Pumping out water (no fires)	2
Lighted candle igniting wall	1	Rubbish on oven ignited	1
Lamp left lit after retiring	1	Spontaneous combustion	3
Lighted cigar, cigarette, or match igniting rubbish	2	Sparks from forge	2
Naphtha explosion	1	Stove improperly connected with stove-pipe	1
Overturned lamps	16	Stovepipe igniting adjoining boxes	1
Overheated flue	1	Spark from steam road roller	1
Overturned tar kettle	1	Stove igniting side of house	1
Overturned kerosene can	1	Unknown	9
Overturned small native stove	1		
Opium lamp igniting clothing	1	Total	101

EXHIBIT F.—*Buildings, how occupied.*

Place of fire.	Num-ber.	Place of fire.	Num-ber.
Aqueduct (no fire)	1	Hole for new hydrant (no fire)	1
Automobile (on street)	1	Houses of ill fame	2
Bakeries	2	Ice plant	3
Barracks	1	Laundries	2
Blacksmith shop	1	Meeting hall	1
Boarding house	1	Office	1
Boat:		Photograph gallery	1
Cargo	1	Place of amusement	1
Coal	1	Restaurant	1
Freight and passenger	1	Shed for heater	1
Confectioner	2	Shed for gas-making machine	1
Contractors	1	Storehouse	1
Chinese store	1	Stores	3
Dentist parlor	1	Store:	
Distilling plant	1	General merchandise	2
Drug stores	2	Dry goods	1
Dumping ground	1	Millinery	1
Dwellings	35	Sawmill	1
Factory:		Saloon and billiard hall	1
Box	1	Saloon and dwelling	1
Carriage	1	Warehouses	5
Cigar	1	Warehouse and office	1
Cigarette	1	Tailor shops	2
False alarms (no apparent fires)	2	Tenement house	1
Hospital, veterinary	1	Tenement and canteen	1
Hospital for lepers	1		
Hotels	2	Total	101
Hotel and bakery	1		

EXHIBIT G.—*Expenses fiscal year 1904.*

Salaries, Fire Department	¥ 181,354.95
Apparatus	31,339.00
Equipment for apparatus	23,074.29
Repairs to apparatus	614.22
Equipment for fire stations	4,517.21
Forage	17,799.05
Fuel	3,495.57
General supplies	10,259.42
Printing and binding	1,421.50
Labor, fire and police alarm system	7,145.47
Material and supplies, fire and police alarm system	19,541.43
Total	300,562.11

Among the principal items of expenditure were the following:

Apparatus:

3 steam fire engines	P27, 489. 00
1 gasoline engine	3, 850. 00

Equipment for apparatus:

Engine and truck extras	4, 431. 37
Harness	2, 327. 70
5 American horses	2, 310. 00
2 fuel wagons	1, 636. 54
48 stall guards	1, 068. 06
2,000 feet fire hose	3, 707. 00
Vajen smoke helmets	1, 310. 06
Nozzles and nozzle holders	812. 73
Harness hangers	549. 78
Electric horse releasers	352. 00
1 buggy, City Electrician's	847. 00
1 wagon, fire and police alarm system	539. 00
48 firemen's hats	609. 64
Scaling ladders	415. 80
Life belts	499. 75

Material and supplies fire and police alarm system:

Instruments	2, 014. 86
Fire-alarm boxes	861. 96
Fire and police alarm poles	5, 317. 84

Equipment for fire stations:

Chairs	349. 56
Desks and tables	729. 85
130 iron beds	2, 376. 22
28 mattresses	824. 21

EXHIBIT H.

Apparatus and equipment in service.—Headquarters: One buggy, Chief's, single hitch; 1 buggy, Deputy Chief's, single hitch; 1 fuel wagon, single hitch; 1 supply wagon, single hitch. Engine Company No. 1: One steam fire engine, Metropolitan, second size, triple hitch; 1 hose wagon, second size, double hitch. Engine Company No. 2: One steam fire engine, Metropolitan, second size, triple hitch; 1 hose wagon, second size, double hitch; 1 station supply cart. Engine Company No. 3: One steam fire engine, Metropolitan, fourth size, double hitch; 1 hose wagon, second size, double hitch 1 station supply cart. Engine Company No. 4: One steam fire engine, Metropolitan, fourth size, double hitch; 1 hose wagon, fourth size, double hitch; 1 station supply cart. Engine Company No. 5: One steam fire engine, Metropolitan, fourth size, double hitch; 1 hose wagon, second size, double hitch. Chemical Engine Companies Nos. 1, 2, 3, and 4: Each equipped with one chemical fire engine, double tanks, capacity of 160 gallons, double hitch. Hook and Ladder Companies Nos. 1 and 2: Each equipped with one truck carrying 198 feet of ladders, double hitch.

In reserve.—One steam fire engine, Merryweather (English), double hitch; 3 hose wagons, fourth size, double hitch; 1 station cart, 4 double sets harness, quick hitching.

Electrical branch.—One buggy, City Electrician's, single hitch; 1 wagon, Studebaker, double hitch; 2 carretelas.

Invoices for the four second-size hose wagons not yet received. Their total cost is P6,696.

Fire hose (2½ inch) in service.—Amazon, 4,550 feet; Paragon, 6,000 feet; Victor Jacket, 2,000 feet. Of the foregoing about 500 feet is almost unserviceable.

Horses.—June 1, 1903, on hand: American, 33; Australian, 1; native, 11. Purchased, American, 14; received by transfer, 2; loss by death, American, 2, native, 1; transferred, American, 2. June 30, 1904, on hand: American, 45; Australian, 1; native, 10.

An exchange of 2 American horses was made with the Department of Engineering and Public Works by direction of the Municipal Board, the horses transferred from this department being unsuitable for the service.

Of the 14 American horses purchased, 9 received April 30, 1904, have as yet not been paid for owing to invoices for same not yet received.

February 26, 1903, American horse No. 22, attached to Engine Company No. 3, dropped dead on Calle Herran while responding to an alarm of fire.

December 5, 1903, American horse No. 29, attached to Hook and Ladder Company No. 2, died of enteritis.

May 10, 1904, native horse No. 9, attached to Engine Company No. 3, expired suddenly, due to valvular insufficiency of the heart.

EXHIBIT I.

MANILA, P. I., *August 16, 1904.*

GENTLEMEN: In compliance with the rules and regulations governing this branch of the Fire Department, I have the honor to submit to you my annual report for the fiscal year ending June 30, 1904, together with my recommendations for the improvement of the electrical branch:

During the year there were 61 alarms received on the fire-alarm system and transmitted to each station perfectly, with the exception of one from box 54, which failed to come in correctly on account of dust that had accumulated on the armature of No. 1 repeater, but which was immediately remedied.

Every box was inspected and a local test made each month. There have been 21 cases of wire trouble, the greater part caused by crosses from foreign circuits. Have had four open circuits and several heavy grounds caused by trees and dampness.

During the year the No. 5 circuit was out of service for nineteen minutes, the No. 6 circuit for thirty-four minutes, and the No. 3 circuit for twenty-five minutes.

The entire system has never been out of service since it was installed. I have been rebuilding the system as fast as I could obtain the material necessary for protecting it from further wire trouble and grounds.

During the year metallic telephone lines were installed from each fire station to headquarters, which gives the department an independent telephone system.

The police-alarm system has given perfect satisfaction. Have had considerable wire trouble caused by induction and crosses from foreign circuits. The system is being gradually rebuilt, which will obviate this trouble in the future.

The work of the inspecting department has effected great improvement in inside installations, and a reduction in the fire risk of at least 50 per cent.

There have been issued 1,453 certificates of inspection and 1,623 permits for installations and remodeling, and there have been collected \$1,977.75. United States currency, for inspection fees. Installed 13 telephones in city hall and one 100-drop telephone switchboard with 28 connections. Built new line from corner of Calles Arroceros and Concepcion to Germinal Cigar Factory. Changed cable box and pole at Parian Police Station. Removed one 100-drop switchboard and installed one 20-drop board at city hall. Rebuilt fire and police alarm circuit from Calles Concepcion and San Marcelino along Calle San Marcelino to Calle Herran, and from there along Calle Herran to Paco Bridge, Calle Real, Paco. Built new line to new Tondo fire station.

Rebuilt line from Rotonda to Calle Nagtajan. Assisted Signal Corps in resetting four poles on Calle Tanduay carrying city lines. Cut gong and tele-

phone in new Tanduay fire station. Painted all fire and police alarm boxes. Assisted Signal Corps to reset one 50-foot pole at Calles Nueva and Padre Faura carrying city lines. Moved fire-alarm box No. 152 from ice plant to opposite side of street. Wired four lights and one receptacle on sanitary boat *Pluto*. Installed fire gong in river and harbor police station. Removed main fire and police alarm wires from Signal Corps poles on Calle Arroceros to main fire and police alarm line on Calle Concepcion and Plaza Lawton, leading to Parian. Changed fire-alarm box No. 146 from Malecon Drive to Depot Quartermaster's warehouses. Rebuilt entire fire and police alarm line on Calle Cervantes, Santa Cruz. Built new line and set 10 poles on Calle Singalong.

Installed fire-alarm box No. 147 on Calle Herran, Paco, and box 167 on Calle Singalong, Paco.

Installed in Civil Hospital 750 feet No. 6, 500 feet No. 10, and 1,000 feet No. 14 rubber-covered wire; changed 6 lights and installed 4 new switches, 42 additional lights, 20 fan circuits, one switchboard for 4 electric stoves; installed 1 electric cauterizing apparatus; repaired storage battery. Installed 76 new ear telephones in police boxes, rewound 5 induction coils. Installed 12 new local batteries and 12 new automatic telephone drops on police-alarm boards. Installed one automatic time stamp and punching register on fire-alarm system. Installed 7 lights in city stables.

Cross-armed the fire and police alarm line from Calle Novaliches along Calles San Miguel and Echague to Plaza Goiti. Erected two wires from Dr. Stafford's residence to Plaza Goiti for police telephone. Spliced three poles on Calle Echague to raise circuit over the telephone company's wires. Renewed entire storage batteries on both the fire and police alarm systems. Removed searchlight from Coast Guard boat. Installed same on San Miguel Brewery. Wired switchboard for testing meters. Installed automatic transmitter and police gong at Malacañan Palace. Installed telephone for Police Inspector Luthi at his office, and one fire gong in residence. Installed one fire gong at residence of Chief of Police, Calle San Luis, Ermita, removing same from his former residence on Calle Magallanes. Removed telephone from old residence of Chief of Police. Installed 3 lights in San Nicolas fire station. Took out of circuits 9 crosses caused by telephone company. Removed fire and police alarm wires on Calle Canonigo, Paco, from electric-light poles, and placed them on city poles. Cut fire-alarm circuits Nos. 1, 2, 3, 5, and 6 through all police cable boxes to guard against lightning.

Established 16 ground wires on fire and police alarm system. Installed duplicate fire-alarm box No. 47 in yard of city stables on Calle Azcarraga; duplicate box No. 152 in Arroceros Shops. Removed 2 poles from Plaza Santa Cruz, 2 from Calle Timbugan, and 2 from Calle Real, Malate. Changed 4 poles on Calle Herran out of way of water main. Set 2 poles on Calle San Andres, Malate; 2 at city stables, Azcarraga. Set 1 guy stub on Calle Bilibid near Calle San Pedro. Changed 3 police-alarm boxes. Moved ceiling fan in office of City Assessor and Collector. Removed all iron fixtures from line on Calle Alix and cross-armed same. Set one junction pole at corner of Calles Padre Faura and Nueva. Trimmed trees on main fire and police alarm line and on telephone line from Rotonda to El Deposito. Installed 25 lights in office of City Assessor and Collector that were torn down by carpenters. Installed 5 additional lights in city hall. Repaired 23 lights in school building at Calle Victoria, and installed 5 new pendants. Installed shades, fixtures, receptacles, sockets, and cords on installation in new city hall, making 199 openings in all.

Made 105 cross arms and 120 cross-arm braces. During the typhoon fire and police alarm wire on San Miguel was broken by a falling tree. Repaired one light and switch at city stables on Calle Anda. Installed fire gong, automatic switch, tapping-out button, and 8 unhitchers at Tanduay fire station.

Installed 3 new lights at San Nicolas fire station. Installed 25 lights in city stables. Installed 2 electric fans in Office of City Assessor and Collector. Installed 25 lights in band stand, Binondo. Completed the installation in city hall, Calle Victoria, of 6 electric fans and 74 lights. Made 273 eight-pin cross arms. Repaired lines at mouth of Binondo Canal damaged by the S. S. *Dos Hermanos*. Installed fire gong in residence of Deputy Chief Hoey. Moved fire and police alarm box from old pole to new one on Calle Real, Malate. Installed 2 telephones and 1 two-drop switchboard for Insular Purchasing Agent, who furnished material. Installed 4 switches at Anloague police station. Installed 3 lights in matadero (slaughterhouse). Removed electric-light and fire-alarm wires from Tanduary fire station to temporary quarters. Changed electric-light mains at Santa Cruz fire and police station to cut on separate meters. Installed 1 extension bell at Civil Hospital. Set 32 50-foot poles from corner of Calles Azcarraga and Misericordia to corner of Asuncion. Set 3 poles on Calle Ilaya, Tondo, off Azcarraga. Removed 4 45-foot poles from Calle Asuncion. Set 5 poles on Calle Lemery off Azcarraga. Set 3 poles on Calle Reina Regente. Cut 15 telephone wires on Calle San Luis, Ermita, that were in a dangerous condition owing to their proximity to electric-light wires.

Transferred fire and police alarm wires from corner of Calle Misericordia along Calle Azcarraga to Calle Asuncion, and all taps off electric-light poles to new city poles. Installed fire-alarm box No. 135. Set 3 poles on Calle Lacoste and 2 poles on Calle Sacristia to raise wires over new buildings; set 1 pole on Calle Salazar and cross armed the entire line on Calles Lacoste and Sacristia.

The fire and police alarm circuits have been rebuilt on the following streets with new poles, the property of the city: Azcarraga, from Misericordia to water front; Concepcion; Cervantes; San Marcelino; Canonigo; Real, Intramuros; water front, from Bridge of Spain to Calle Principe.

New lines were constructed from Parian police station along wall and across moat to new city hall, San Marcelino, and Calles Herran and Singalong.

The following fire-alarm boxes were installed: Nos 124, 125, 126, 127, 47, 152, 22, 167. Box 147 changed from Malecon Drive to Calle Herran; box 146 to quartermaster corral. Made the usual repairs to the fire and police alarm system.

For the protection of life and property I would recommend that the ordinance now pending be passed immediately, and that no more time be granted the different corporations to rebuild their outside construction in this city. I understand there is but one section of this ordinance to which exception is taken, and I again respectfully ask you to please lay aside this section regarding meter charges and pass the rest of the ordinance immediately.

In conclusion I beg to express my sincere appreciation to your honorable Board, Chief Bonner, Chief Dingman, Chief of Police Harding, and the members of the department for the able assistance I have received at all times in this branch of the service, and to state that all the employees of this office are to be commended for their untiring and faithful efforts to keep this branch of the service in first-class condition.

Respectfully submitted.

FRANK MOFFETT, *City Electrician.*

The MUNICIPAL BOARD,

Manila, P. I.

(Through Chief of Fire Department.)

REPORT OF THE CITY ASSESSOR AND COLLECTOR.

DEPARTMENT OF ASSESSMENTS AND COLLECTIONS,

Manila, P. I., September 3, 1904.

GENTLEMEN: In submitting this, the third annual report of the Department of Assessments and Collections, attention is first invited to the report of the Chief Deputy Assessor, giving in detail, more or less, the work done and results obtained in the division of assessments:

REPORT OF CHIEF DEPUTY ASSESSOR, CAPT. HENRY STEERE, COVERING
THE DIVISION OF REAL-ESTATE ASSESSMENTS.

Work in the subdepartment of assessments for the fiscal year just closed has been, since the adjournment of the board of tax revision, along the lines of perfecting the details of office records and the assessing of new improvements, together with the never-ending routine work incident to this department.

THE BOARD OF TAX REVISION.

The board of tax revision, which began its work in February, 1903, completed its labors in the middle of October of that year. During this period all records of the assessment division and all clerks of the record division, with but two exceptions, were set apart for the exclusive use of the board, while the drafting division supplied many tracings and plans and made several surveys for its benefit.

The tax rolls for 1903, as turned over to the board at the commencement of its work of revision, showed taxable real property in the city of Manila to the value of \$41,980,902.85; as revised by the board the total value of taxable real estate was reduced to \$37,103,577, as per Exhibit A.

The tax rolls for 1904 shows a valuation of taxable real estate of \$37,407,768. (Exhibit B.) The very small increase is accounted for by the large amount of property exempted for the Roman Catholic Church and religious orders, by order of the court, and by the transfer of private property to the Government. The principal items among such exemptions are the Oriente Hotel property and experimental farm, valued at \$267,836 and \$17,153, respectively. The property exempted for the church and orders by order of the court was valued at \$1,155,233.

EXEMPT PROPERTY IN THE CITY OF MANILA.

A statement of exempt property, exclusive of small parks and plazas, has been carefully prepared (Exhibit C), and is as follows:

Owner.	Valuation.	Per cent.
Insular Government	\$6,373,647	10.65
War Department	3,528,417	5.90
City of Manila	2,713,326	4.53
Roman Catholic Church	3,150,752	5.25
Roman Catholic orders	4,705,704	7.83
Protestant churches	44,719	.07
Miscellaneous	34,206	.05
Undetermined	1,945,842	3.25
Total	22,496,613	37.55

The total valuation of real estate, taxed and exempt, of this city, including two cemeteries belonging to the city, and situated just outside its boundaries, is \$59,904,381, of which \$37,407,768, or 62.45 per cent, is assessed for taxation and \$22,496,613, or 37.55 per cent, is exempt—a condition of affairs that probably does not exist in any other city under the government of the United States.

APPRAISEMENT OF BUILDINGS.

During the past fiscal year the following appraisements have been made:

Kind of building.	Number.	Valuation.
Of light materials, new	3,200	\$252,356
Of strong materials, new	801	1,605,698
Government buildings, old and new	302	5,686,054
Total	4,303	7,544,108

The major portion of strong-material buildings was added to the tax rolls of 1904, the exceptions being those incomplete on the 1st day of January, which go upon the rolls for 1905.

Method of appraising buildings of light materials.—This has been somewhat of a knotty problem heretofore. The following plan was put into operation in December last: First, a schedule was prepared, giving approximately the value per square meter of a building of light materials, the price varying in accordance with the class of materials and the relative quantities used. Second, a notice was delivered to the owner of each new building, or to the agent or other representative of the owner, stating that the house in question had been appraised on a certain date, its value fixed at a certain sum, and requesting the owner to file declaration for the same within six days of receipt of notice therefor. In case of his failure to comply it would be assumed that he conformed to the valuation placed upon his house, and an inspector's declaration would be made to cover it. A receipt was taken on the delivery of each such

notice. Third, natives were employed as inspectors, furnished with a measuring stick a meter in length, a book of blank notices of the kind heretofore mentioned, scratch paper for computing superficial areas, a plan of the block or blocks to be inspected for new houses, and a tariff for his guidance in filling out the blanks.

This method was found to work in the main satisfactorily, although instead of beginning in November, as we had planned, the men requisitioned for—10 in number—were not available until December, and came to us one or two at a time until we had seven men. Their pay was \$20 per month. Of the houses inspected but 14 per cent of the owners failed to make their own declarations.

With an amplification of the building schedule and tariff and by beginning promptly on time with the full force required—10 men—it is believed that better results will be obtained this year.

Difficulty of collecting taxes on small, light-material buildings.—While this is a matter that more nearly concerns the collection of taxes, still, primarily, the difficulties are the locating of these buildings, and, after locating, of keeping track of them, on account of the ease and frequency with which they are taken up and moved to other places.

Two solutions have suggested themselves: First, let landowners pay the tax on all buildings erected on their land. Second, as an alternative, at the time of granting the building permit for the erection of a building valued at less than \$1,000, let the fee for the building permit carry with it a sum sufficient to pay the tax on the building for one year, dating from the 1st of January following the issuance of the permit.

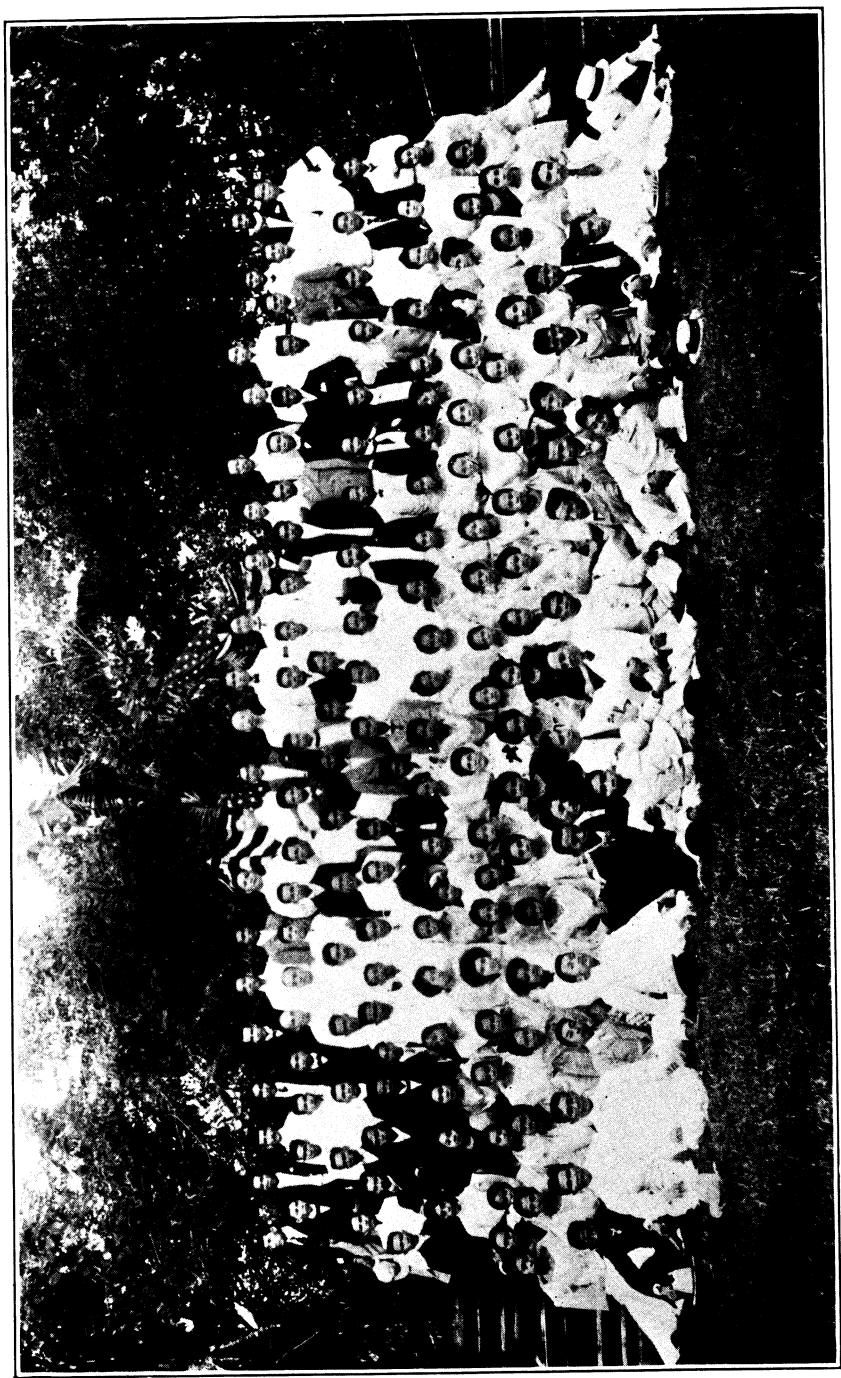
SURVEYS.

The survey of the city by blocks is being carried on as in the past, and of the 770 blocks in the city we now have reliable data on 90, leaving 680 blocks yet to be surveyed.

How inaccurate declared superficial areas are found and corrected.—It has been found that the so-called "exact" plans furnished in many cases by owners of property are often more or less at variance with the results secured by careful surveys. Where variations are disclosed by the survey a circular letter is sent to the owner, inviting his attention to the area as declared, the area secured by departmental survey, and the difference in the area existing, with a request that he call in order that the discrepancy may be pointed out with more particularity. A clause in the circular reads as follows:

Should you not call within ten days of the date of writing this letter, it will be assumed that you conform to the superficial area as arrived at by municipal survey, and the records of this department will be corrected accordingly.

By this method inaccurate areas, wherever discovered, are corrected with the acquiescence, expressed or implied, of the owner.



NATIVE TEACHERS OF ENGLISH.

Surveys now made by the City Engineer.—On December 9 last the surveyor, chief of our drafting division, transferred elsewhere, and since that time the engineers of the Department of Engineering and Public Works have, upon requisition, promptly furnished this office with plans of the exterior lines of blocks requiring survey, our own draftsmen using these plans as a base, delineating the subdivisions of private owners from tapeline measurements made on the ground.

PERSONNEL.

The large force employed for the original assessment was, of necessity, extensively American. To-day our modest force of 14 regular employees finds 2 Americans and 12 natives. The frequent absences and tardiness at first experienced with the latter have disappeared. Careful and patient supervision has brought them to an appreciation of punctuality and continuous work during office hours.

In this connection I would respectfully advocate that, after the native has proved himself to be a good clerk, his pay should be gradually increased until a standard is reached that will furnish a decent living for himself and family and enable him to educate his children at the public schools. Twelve, fifteen, or twenty dollars per month for efficient office men is insufficient pay; \$25 to \$40 per month, graduated upon length of service and character of work performed, would be to them an inducement to attain the highest standard of excellence, and to remain contentedly in the department in which they have grown up, so to speak.

Maintain present standard of real-estate taxation.—The application of our municipal law to the taxation of real property in the city, judged by numerous conversations had with assessors and tax collectors in the United States during my recent visit there, leads me to believe that Manila to-day is nearer the ideal sought for by exponents and students of advanced taxation methods than any city in the United States of which I have knowledge.

The valuations carried on our tax rolls represent very closely the real value of the property. In the appraisalment of the older improvements it has been a very difficult matter to arrive at the true value of many buildings, and inequalities doubtless exist in them. On land proper, generally speaking, the values are fair and equitably distributed. It is to be hoped that the present standard will be rigidly adhered to, and the pressure always brought to bear for a reduction of real-estate values will be steadfastly resisted. Modern tax methods have demonstrated the fact that where the real value of real estate is used the per cent of tax levy is less and the distribution of the tax burden is more equitable and just.

Up to July 1, 1904, all values in the assessment division were

expressed in United States currency, and so in this report all values pertaining to real-estate assessments are likewise expressed in United States currency.

All other values quoted herein are expressed in Philippine currency.

DIVISION OF COLLECTIONS.

[Mr. R. E. WHITING, *Chief of Division.*]

REAL-ESTATE TAX.

Following the report showing the results of the work done by the assessment division of the real-estate department, let us turn to the collection division of the same department and see what has been accomplished in the form of actual revenue collected.

The amount collected by this division was much less than the figure estimated in our previous report, which is due to the change of the levy from 2 per cent (on which said estimate was based) to $1\frac{1}{2}$ per cent, and by reduction of the assessed valuation by the board of tax revision.

During the period covered by this report taxes were collected for the whole of the calendar year 1903 and the first half of 1904, as well as delinquent taxes for 1901 and 1902.

At the close of the fiscal year 1903 there remained unpaid of the tax levied for 1901 the sum of ₱42,269.39, or $5\frac{1}{5}$ per cent of the total tax.

Of the tax levied for 1902 there remained unpaid ₱95,095.36, or $7\frac{3}{4}$ per cent of the total tax.

During the fiscal year covered by this report there was collected—

On account of delinquent tax for the year 1901 the sum of	₱23,882.82
Plus penalty and interest	5,453.18
	<hr/> 29,336.00
Deducting rebates of urbana and frontage taxes	212.62
	<hr/> 29,123.38
Gives a net collection of	
And reduces the delinquency to ₱18,173.995 for 1901.	
Of the tax for 1902 there was collected	52,715.62
Plus penalty and interest	11,853.74
	<hr/> 64,569.36
Less rebates	46.96
	<hr/> 64,522.40
Gives a net collection of	
And reduces the delinquency to ₱42,322.78 for 1902.	

(On the delinquent tax rolls of 1901 and 1902 appear many pieces of property now valued at not more than ₱50. By Act No. 680 all property listed on the 1903 and subsequent books at such values has been exempted. It is suggested that a similar provision be made for

the exemption of this kind of property on the 1901 and 1902 books. The list of delinquents has been thoroughly worked up by our inspectors, who report that many houses, mostly nipa shacks of small value, have been destroyed by fire or by order of the authorities. In many cases also the inspectors have found it impossible to locate houses or get any information about them or their owners. None of this property can be included in the delinquent tax sales, and the cost of collecting by other means would exceed receipts, if indeed it would be possible to collect at all. The cancellation of all such entries seems to be the only practicable method to follow. As a result of the surveys many discrepancies were discovered in the land assessments. The necessary cancellations have been made from the 1901 and 1902 books, and other property found to have escaped taxation in those years has been taken up on the 1903 and 1904 books as additional assessments.)

The collection of the real-estate tax for 1903 was not begun until November 25, 1903, on account of the revision of values by the board of tax revision, which delayed the completion of the tax rolls. The tax for the whole year was collected in one installment, and the period within which to pay the tax without penalty was postponed to January 15, 1904. The total tax levied for 1903 was ₱1,076,030.76; deducting from this sum credits of ₱73,384.44 allowed under Act No. 975 and ₱1,026.10 for urbana and frontage taxes, and adding ₱10,111.88 collected as delinquent penalties and interest, we have a net collection of ₱985,740.64 and a delinquency of only ₱25,991.46, less than 2½ per cent.

For 1904 the City Assessor and Collector proceeded to collect the tax corresponding to the first half of the calendar year 1904 on the levy of 2 per cent as fixed by section 47 of the Manila Charter, or 1 per cent for the half year. Under Act No. 1190 the tax rate was reduced to 1½ per cent, and the amount of tax finally levied for 1904 under the revised rate was ₱1,122,262.79, as follows, to wit:

1½ per cent on assessed valuation of ₱74,815,536	₱1, 122, 233. 04
To this is added property which escaped taxation in 1901, 1902, and 1903, the sum of	1, 685, 36
	<hr/> 1, 123, 918. 40
From this should be deducted cancellations made on account of erroneous and duplicate assessments, amounting to	1, 655. 61
	<hr/> 1, 122, 262. 79
Net tax	
Of the above amount the sum of ₱645,871.58 has been satisfied by payment or credit as follows:	
Credits under Act No. 975	12, 019. 62
Credits on account urbana tax	23. 40
Cash, net	633, 828. 56
	<hr/>
Total	645, 871. 58

In a few cases payment of the tax for the whole year of 1904 was offered and accepted at the rate of 2 per cent prior to the enactment of Act. No. 1190 reducing the levy to $1\frac{1}{2}$ per cent. The excess tax so collected amounts to ₱3,587.81, which will have to be refunded.

Summarized, the total cash real-estate tax collections for the fiscal year 1904 was ₱1,713,214.98.

DELINQUENT AT CLOSE OF PERIOD.

Expunging houses valued at less than ₱50 and all assessments known to be uncollectible, as parenthetically explained above, together with the necessary cancellations on account of duplicate and erroneous assessments, there remain delinquencies at the close of the fiscal year 1904 as follows:

For 1901, on 174 pieces, amounting to ₱3,585.86, or 0.48 per cent of the total tax.

For 1902, on 349 pieces, amounting to ₱13,481.42, or 1.16 per cent of the total tax.

For 1903, on 1,502 pieces, amounting to ₱25,991.46, or 2.4 per cent of the total tax.

DELINQUENT TAX SALES.

Three sales of real property have been held to satisfy delinquent taxes. Notices of sales according to law were posted in various public places and published in The Manila American and El Comercio. The sales were held at the main entrance of the city hall, and were conducted in accordance with the method of procedure laid down in sections 78 and 79 of the Municipal Code.

First sale, September 16, 1903, three pieces of property were sold and the sum of ₱5,107.42 realized.

Second sale, November 2, 1903, twenty-two pieces of property were sold and the sum of ₱3,695.64 realized.

Third sale, December 26, 1903, fifty-two pieces of property were sold and the sum of ₱925.92 realized.

Up to the present time only twelve pieces of property thus sold have been redeemed.

Another sale will take place in the near future by which it is hoped to clean up the books for 1901 and 1902 of all taxes on a valuation in excess of ₱50. Those for a less amount may as well be canceled as to further attempt to collect them, as before suggested.

While upon the subject of tax sales, the writer would respectfully call attention to the law governing same, or, rather, to the interpretation of the law we are now operating under, which directs that the sale be made to the bidder who will satisfy the tax, penalty, and interest for the least number of square meters from off the east side of the whole tract offered for sale, determined by a line drawn due north and south through said tract. The law upon this particular point provides that the City

Assessor and Collector shall "advertise the real estate of the delinquent for sale, or so much thereof as may be necessary, to satisfy all public taxes, etc.," which, to me, seems capable, at least, of a different construction from that now in operation.

Why not apply the exact letter of the phrase quoted above and let the City Assessor and Collector determine before sale, or even before advertising, what portion of the property will be offered for sale to satisfy the tax, etc.? As now operated, a line drawn due north and south to embrace a given area on the east side might and frequently would undoubtedly divide the improvements. In the case of the tax being upon the improvements only it would be difficult, in the event of competition, to operate the law as now construed.

The law, I think, should be amended in a few particulars, else a different interpretation be given it. The best plan I am familiar with is to sell the whole property to the bidder offering the lowest rate of interest. If the law is to be amended at all, it is hoped that this last-mentioned suggestion may be favorably considered, and that provision will also be made whereby it will be incumbent upon the holder of the tax certificate to give the owner or agent thirty or sixty days' notice of expiration of the redemption period and of his intention to apply for a tax deed before same can be demanded. Also, that the suggestion appearing in the report of the Chief Deputy Assessor (which said report is made a part of this) whereby he recommends "that the owner of the land be assessed for all the improvements upon said land, whether said improvements are the property of the landowner or not," may be favorably considered.

RENTS OF CITY PROPERTY.

Receipts from this source were ₱15,817.37, as against ₱9,018.36 for the preceding year. This increase is partly accounted for by the advance in the monthly rental of the kiosko at the corner of Calle Nueva and Escolta from \$43, local currency, to ₱310, which became effective June 1, 1903.

The fact, too, that this report shows for the first time a full year's collection from the new municipal tenement on Calle Valderama, District of San Nicolas, further accounts for a part of the increase over last year's receipts. This tenement made a good showing for the year, its apartments having been occupied to the limit the whole time, and has demonstrated the feasibility of municipal ownership of tenement houses in Manila. Such tenements are desirable, not only from a sanitary standpoint, but are also an assistance in teaching the class of people occupying them better habits and methods of living, besides being a source of fair revenue. Your honorable Board would not go amiss in erecting more such houses upon some of the vacant and nonproductive land belonging to the municipality.

Upon the subject of rents the undersigned would further report that

there are 68 entries of property upon our rent rolls. Of these only 13 pieces are under contract, two of which the occupants claim and hold possession under what they term a "perpetual Spanish contract," at a nominal rental. The other properties are occupied subject to the will of your honorable Board, and but few pieces are yielding any more rent than they did in the early days of American occupation. Rental conditions here have greatly changed since then, so that now in many cases the rents paid to the city seem absurdly low. It is our belief that much of this property could be placed under time contracts or leases and made to yield a much larger revenue.

LICENSE DIVISION.

[Mr. W. D. HOBART, *Superintendent.*]

The increase in license receipts for the fiscal year covered by this report of \$27,725.99 over those of the preceding year is in part accounted for by the increased worth of the money in which the tax is imposed. The appreciation in value of the fees collected was partially offset, however, by a decrease in the number of several classes of liquor licenses, principally bar and restaurant liquor licenses, as shown in table below. No separate record of liquor and business license fees is kept, but the different classes will be segregated in the future.

On November 25, 1903, with the coöperation of the Police Department, a new system for enforcing the license ordinances was put into effect, which was necessitated by the inability of the license inspectors, with their other duties to perform, to make a thorough canvass of all persons conducting a business within the city. The new system consists in notifying the commanders of the several police precincts daily of all delinquent licensees, and semimonthly of all licenses issued and denied. Upon such notifications the precinct commander makes an investigation, takes the necessary action, and advises this office of same. Thus the police, covering as they do every street in the city, make it practically impossible for anyone to evade the license ordinances. The immediate effect of the new policy was the arrest and conviction of many delinquents, and many more hastened to take out licenses. Practical proof of the success of the new policy is given by the figures below, showing a large increase in the number of licenses over last year. In this connection opportunity is taken to acknowledge the prompt response and hearty coöperation of the Police Department in this work.

There are 1,360 places in the city where native wine is sold for consumption on the premises; 142 places where beer, wine, or liquor, other than native wine, is sold for consumption on the premises (exclusive of clubs), and 123 places where beer, wine, or liquor (including native wine) is sold to be consumed elsewhere—making a total of 1,625 places where liquor is sold, an increase of 145 over the preceding year, which increase

is wholly in native-wine licenses, there being an actual decrease in other kinds of liquor licenses of 47.

The tables in last year's report of drinking places, by districts, with reference to population, are not duplicated this year, as the few changes in the number of places since then have no special significance.

The following is a comparative statement of all written applications received and disposed of during the period covered by this report and the fiscal year ending June 30, 1903. No written applications are required for peddlers' licenses or for "performance" licenses in places of amusement:

Applications.	1903.	1904.	Increase.
Number received	11,210	13,563	2,353
Number disapproved	220	233	13
Number uncalled for or withdrawn	1,546	1,660	114
Number issued or transferred	9,541	11,730	2,189
Number surrendered, revoked, or taken up	34	114	80

The following is a statement of liquor licenses issued and transferred in 1904, as compared with 1903:

Class of license.	1903.			1904.		
	Issued.	Transferred.	Total.	Issued.	Transferred.	Total.
First-class bar	120	12	132	111	14	125
Second-class bar	130	42	172	124	30	154
First-class restaurant liquor	54	11	65	49	6	55
Second-class restaurant liquor	28	4	32	26	4	30
First-class hotel liquor	8	2	10	9	1	10
Second-class hotel liquor	2		2			
Theater liquor	3	1	4	5	1	6
First-class wholesale liquor	58	4	62	53	5	58
Second-class wholesale liquor	2		2	2		2
Third-class wholesale liquor	8	1	9	8	4	12
Grocery liquor	89	12	101	87	18	105
Distillers'	7	2	9	7		7
Druggists' liquor	2		2	3	1	4
Brewer's	1		1	1		1
Native wine	1,946	166	2,112	2,587	243	2,830
Total	2,458	257	2,715	3,072	327	3,399

The following is a statement of general licenses issued under the provisions of Ordinance No. 9:

Class of license.	1903.	1904.
Business licenses	6,826	9,793
Entertainment licenses (daily)	1,110	1,154
Peddlers' licenses (quarterly)	6,976	8,376
Surrendered, taken up, or revoked	243	447

PUBLIC-VEHICLE LICENSES.

The number of public-vehicle licenses, including cart licenses, issued in the city of Manila during the period covered by this report was 3,960, of which 1,478 were new licenses and 1,758 were renewals.

There were 376 transfers and 348 duplicates issued, and 825 licenses were surrendered. The total receipts from this source were ₱15,332.60, as against ₱17,423 for the preceding year.

DOG LICENSES.

Dog licenses were issued as follows: Males, 831; females, 351; there were 150 duplicate licenses issued. The total collections aggregated ₱3,295.15, as against ₱2,775.48 for the preceding year.

BICYCLE LICENSES.

There were 505 new bicycle licenses issued, 16 duplicates, and 1 transfer. The fees for the year aggregated ₱1,076.80, as against ₱1,793.68 for the preceding year.

TOTAL RECEIPTS FROM LICENSES.

During the period covered by this report there has been collected in license fees of all kinds ₱357,366.89, as against ₱329,640.90 for the preceding year, an increase of ₱27,725.99.

INDUSTRIAL TAXES.

[Mr. J. F. MCCARTHY, *Chief of Division.*]

This is purely an internal-revenue tax, imposed solely upon commercial and manufacturing industries and occupations, or, in other words, a tax upon business.

From the complaints that have so frequently been heard regarding business conditions here, it had come to be believed by many that business was almost at a standstill, and we would not have been surprised in the least if, in comparison with previous years, a falling off in receipts from this source had resulted. It is therefore gratifying to note that a substantial gain is shown, as will be seen from the statement below. To what extent the collections from this source may serve as an index to the real condition of business the writer is not prepared to say. But, view the fact from whatever standpoint you may, it can not but be an encouraging sign, and is at least an evidence of the dawn of returning prosperity:

On July 1, 1903, the number of patentees in force was	11, 511
New patentees issued during the year	6, 039
Total	17, 550
During the same period there were canceled	6, 144
Leaving in force July 1, 1904	11, 406

The slight decrease in number may easily be accounted for by the application of more stringent measures on the part of the board of health, the Police Department, and of our own inspectors against the

licensing of small tiendas in unsanitary and otherwise objectionable places.

The total collection of industrial taxes for the fiscal	
year amounted to the sum of -----	₱609,479.75
Compare this with the collection for the previous year of	461,658.04
A gain is shown of -----	147,821.71

It is true that a considerable portion of this increase may be accounted for by the collection of certain delinquent taxes that really accrued in 1902 and 1903 and over which there had been some controversy. The reclassification of certain first and second class bar licenses, placing them under a higher tariff than before, together with the imposition of all taxes in Philippine currency since January 1, 1904, in lieu of Mexican currency, go also to explain a part of the gain shown above.

But aside from the above-enumerated causes, accounting for a very considerable part of the increased receipts, there is a substantial legitimate gain that can be accounted for upon no other grounds than improved business conditions, and the fact should tend to controvert the wail of the pessimist regarding business conditions here at the present time.

VEHICLE TAX.

The receipts from this source show an increase over the preceding year of nearly ₱10,000, or about 20 per cent.

The tax was collected on 6,853 vehicles, and although the tax is considered to be only upon vehicles, 2,371 "excess" horses and 69 "excess" carabaos contributed to the receipts under this head.

In assessing this tax the animal or animals required to draw the vehicle assessed is or are exempted from taxation, but all animals not so required are considered as "excess" animals and subject to a tax of 6 pesos per year.

Collections from this source aggregated ₱51,549.11 (including ₱1,820 in penalties), as against ₱41,905.62 for the preceding year, a net increase of ₱9,643.49. This gain is partly due to the increased worth of the money in which the tax is now imposed and to the fact that many vehicles owned by Government officials and employees and used more or less by them in a semipublic capacity, and, prior to January 1, 1904, were considered exempt for that reason, are now held to be subject to the payment of the tax, as per decision of the City Attorney.

The adoption of a card system of registration also helped to increase the collections, in that it better enabled the department to keep track of delinquent taxpayers.

However, it is a difficult and annoying tax to collect, and a very large number of vehicles and excess horses escape taxation altogether. The fact that it is payable quarterly makes it an expensive tax to collect and an everlasting annoyance to the taxpayer.

The full text of the law creating the vehicle tax is unknown to us. We are guided in its collection by a few extracts only of the original decree, and, as yet, are without the provisions probably laid down for its enforcement.

SALE OF VEHICLE EQUIPMENT.

The licensee of each public vehicle is required to purchase the following equipment: Staff and disc, number plate, and driver's badge, and pay for the painting and branding of the license number on the seat and lamps of the vehicle, as provided by ordinance.

Collections for the year covered by this report amounted to the sum of ₱2,526.90, as follows, to wit:

1,334 staffs and discs, at 60 cents	₱800. 40
1,602 number plates, at 20 cents	320. 40
2,915 drivers' badges, at 30 cents	874. 50
1,329 vehicles numbered by branding and painting, at 40 cents	531. 60
Total	2, 526. 90

As compared with ₱2,634.40 in 1903.

LIVE-STOCK REGISTRATION.

[Mr. A. B. POWELL, *Chief of Division.*]

During the year there have been 4,282 animals registered at a fee of ₱0.20 each, and 3,488 animals transferred, the transfers being made of record at a fee of ₱0.10 each. The fees from both sources aggregated ₱1,108.77, as against ₱1,013.42 for the preceding year. These fees were collected in Mexican currency prior to January 1, 1904.

The fees provided by law for the registration of animals and recording of transfer of ownership are ridiculously low and not equal to the actual expense involved.

At this particular point the undersigned would respectfully recommend that the registration fee for horses, carabaos, and cattle be raised to ₱5, which fee shall cover the full period of original ownership. An additional fee of, say, ₱2 shall be imposed for recording transfer of ownership.

Existing regulations require that animals dying within the city limits shall be cremated, but before removal to crematory the certificate of registration shall be produced and surrendered. The enforcement of this regulation would catch them all sooner or later.

With the registration law thus amended the undersigned would have what is known as the vehicle-tax law (which law applies only to the city of Manila) repealed and eternally forgotten.

It is my firm belief that such a registration tax would yield a larger net revenue than do the present registration and vehicle tax systems combined.

STAMP SALES.

The receipts from the sale of internal-revenue stamps for the fiscal year show a gain over the year preceding of ₱32,903.17, or 24 per cent, as follows, to wit:

Sales for 1904	₱166,067.95
Sales for 1903	133,164.78
Gain	32,903.17

The difference in the value of money in which said sales have been made would account for perhaps one-third of said gain, but the balance may well be taken as an additional sign of returning good times.

CEDULA OR REGISTRATION TAX.

The receipts from this source were as follows, to wit:

58,927 cedula, at ₱1 each	₱58,927.00
18,850 cedula, delinquent, at ₱2 each	37,700.00
Total (77,777 cedula)	96,627.00
Practically all of the ₱2 cedula were paid for in Mexican currency and at a loss of	5,200.63
Actual collections in Philippine currency	91,426.37

For 1903 collections from this source aggregated ₱104,177.58. This shows a falling off for 1904 of ₱12,751.21, and can be accounted for very largely by the reduced number of delinquents. In 1903 comparatively few escaped taking out their cedula before July 1, the result, probably, of the more stringent measures for the enforcement of this tax provided by Act No. 655. Unusual opportunities were also afforded the public by this department by the establishment of branch collection stations in different parts of the city where cedula could be obtained with little loss of time or trouble. As suggested, these facts would account for the diminished delinquent list. There is also a falling off in the total number of current cedula issued as compared with 1903, which is partly accounted for by the fact that many persons from nearby provincial towns, where the tax becomes delinquent at an earlier date than in Manila, formerly applied to this office for cedula after becoming delinquent at home. During the past year, so far as it was possible to determine, persons having homes outside of the city limits were refused cedula here. The number of such persons may be estimated at 2,000, and it is quite probable that there are between 5,000 and 6,000 persons in the city of Manila who are subject to this tax who up to July 1 had failed to take out a cedula for 1904.

THE PUBLIC MARKETS.

[Mr. HUGH MCKENZIE, *Superintendent.*]

Seven public markets were operated during the year, as follows, to wit: Divisoria, District of Tondo; Quinta, District of Quiapo; Arranque,

District of Santa Cruz; Herran, District of Malate; Anda, District of Intramuros; Sampaloc, District of Sampaloc; Santa Ana, District of Santa Ana.

Returns from all of these markets show an increase in receipts, with the exception of Anda, in which there never has been more than a small per cent of the stalls occupied.

Market tax was collected from bay and estero landings where sales are made. No tax, however, is collected on consignments of goods.

A new wing was added to the Arranque market, which was opened for occupancy January 31, 1904. This was a much-needed improvement, and is appreciated by the public as well as by the market people, who, with the additional room and conveniences afforded, can better handle their goods and make them more presentable. It will also prove a good investment for the city by reason of increased revenues.

The Santa Ana market also was very much improved by the putting on of a new roof.

Exhibit D is a detailed statement of the business done in the several public markets during the year. The market tax was collected in local currency up to January 1, 1904. The total receipts for the period covered by this report, reduced to Philippine currency, are ₱285,875.47, as against ₱218,048.94 for the preceding year, a gain of ₱67,826.53, or 31 per cent. The expenses aggregated ₱20,711.69, or a little more than 7 per cent of the total receipts.

The increase of receipts over the preceding year is partly accounted for by the removal of the quarantine restriction of the sale of certain kinds of fish and vegetables and also by the fact that there was an increase in the number of truck farms established near the city. The difference in the worth of the money in which the tax has been collected since January 1 must also be taken into consideration.

The management of the public markets under the superintendence of Mr. Hugh McKenzie, with his three years' experience in this capacity, together with his untiring interest in the work, secures to the city the best possible results and to the market people just and fair treatment.

THE MATADERO.

[Mr. B. E. LEAR, Superintendent.]

The matadero continues to be the first in importance of the city's institutions as a successful public utility as well as a prolific source of revenue.

The installation of a trolley, or carrier, system, with overhead scales, which has long been in contemplation, is now a reality. This is in every way an acquisition, and helps to give the matadero an up-to-date appearance. It effects a great saving of labor to the patrons of the matadero, who now receive their dressed meats right at the wagon, while

before it was necessary to shoulder and carry it all for some distance to the scales, and to reshoulder it again for delivery to the wagon.

The system of Government inspection continues as formerly—that is, inspection by a Government inspector, both before and after killing. This we believe to be as thoroughly and efficiently done as at any of the large packing houses in the States.

The matadero is conducted under the efficient management of Mr. B. E. Lear, who has served in this capacity for the past three years. The utmost cleanliness pervades every part of the plant, and except during the hours of slaughtering nothing offensive to any of the human senses is apparent. It is doubtful if more than a very few of our citizens know that the city has such an institution, and it is consequently but scantily appreciated. It is always open to the public for inspection, and a visit from anyone sufficiently interested in knowing more about what the city has done and is doing along such lines would be most welcome. This last remark applies also to the markets. Any one of our citizens who has never visited the Divisoria market in San Nicolas, the largest of the public markets, would be well paid for the time spent in doing so. The number of people encountered there, selling and buying, as well as the immense amount of business transacted there daily through small sales, would be a revelation to the visitor.

Following is a statement showing, by months, the number of animals slaughtered and the weights of dressed carcasses:

Month.	Cattle.		Hogs.		Sheep.	
	Number.	Weight.	Number.	Weight.	Number.	Weight.
1903.						
July	2,499	315,792.14	5,506	225,617.18		
August	2,746	342,494.38	5,764	235,489.06		
September	2,839	351,765.58	5,408	223,582.59		
October	2,546	323,860.26	5,663	230,045.64		
November	2,124	282,145.34	5,041	212,379.58	80	1,549.78
December	2,514	346,107.22	5,357	226,643.50	137	2,296.20
1904.						
January	2,399	322,765.07	5,283	227,536.38	138	2,159.70
February	2,049	272,057.10	5,083	227,241.68	22	357.22
March	1,996	259,643.80	4,954	225,043.64	1	8.74
April	2,131	265,327.96	5,044	229,631.47	6	35.88
May	896	240,504.04	5,417	245,390.05	16	275.68
June	1,940	237,864.30	4,849	234,133.16	10	122.82
Total	26,679	3,560,327.19	63,369	2,743,733.93	410	6,743.44

A fee of 3 cents per kilo, as provided for by law, was collected for each kilo of dressed meat of all kinds. The total matadero receipts were ₱175,645.34, as against ₱140,491.28 for the previous year, a gain of ₱35,154.06, or 25 per cent, of which not more than one-third can be ascribed to the change from Mexican to Philippine currency. The tax was payable in Mexican currency up to January 1, 1904. Had the law making all taxes payable in Philippine currency been in force the entire year, the total matadero collections would be increased by over ₱13,000.

The expense of maintaining the matadero for the year, including salaries and wages and all ordinary equipment and repairs, was ₱9,612.79 (as against \$14,061.23, Mexican currency, for the previous year), or 5½ per cent of the collections.

SEALING OF WEIGHTS AND MEASURES.

[Mr. VICENTE SAN MARTIN, *Deputy in charge.*]

To the City Assessor and Collector this is a new responsibility, having been transferred from the Department of Engineering June 1, 1904, under the provisions of Act No. 1141, making the City Assessor and Collector the sealer of weights and measures in place of the City Engineer.

By direction of your honorable Board this is made a separate division of this department and is operated by the same personnel operating it while under the control of the City Engineer.

Little has been done during the short period it has been attached to this department. It is not supposed to be productive of much revenue, but is solely for the protection of the public against being defrauded by short weights and measures. To accomplish its purpose, however, it is the writer's belief that something more is necessary than the bare inspection and sealing of the weighing and measuring devices used by the dealers. Short weights and short measures can be easily imposed upon the unsuspecting public, even though standard weights and measures are employed. To more effectually guard against such imposition it will be necessary to follow up the work of standardizing the scales and measures with a system of vigilant inspection whereby an inspector may at any moment enter a place of business and reweigh or remeasure any article that is about to be delivered; and, if found short in weight or in measure, said inspector may cause the arrest and prosecution of the offender.

For selling by a false standard of weights or measures there is a penalty provided by law, but for cheating by weight or by measure the writer is not certain. He is not in doubt, however, as to its being practiced to no inconsiderable degree, especially among the rice and palay dealers at retail. A close watch and a few examples made would soon put a stop to much of it.

Among the weighing devices used here we find both the Spanish and English standards of weight, with a variation between their respective units of 0.00641 kilogram. The more modern scales in use here appear to be of the English standard. The writer is at a loss to know what to recommend as a remedy for this discrepancy. To eliminate either upon short notice would involve a loss and hardship upon many. I do, therefore, ask from you to be instructed in the matter.

In the past the system practiced here for the inspecting and sealing of weights and measures has been to require the dealer using such to

at least once a year bring his paraphernalia to the inspector's office, where it would receive inspection, etc., upon the payment of the fee provided by law. To the writer this plan seems an imposition upon the business public. Many scales are hauled over the rough pavement on carabao carts, receiving, as they must, such a jolting and shaking that it would indeed be remarkable if the scale would show the same condition as when it left the store, and the same would apply to its return trip.

In this connection, the request made at the time this work was turned over to this department for a suitable vehicle to transport the deputy and his outfit of standards, so that the inspecting and sealing can be accomplished at the dealers' place of business, is again seriously urged. Your attention also is again respectfully called to the advisability of putting in at some central location a set of 5-ton wagon scales for public use at a given fee—in other words, a public weighing station.

The total fees collected for the sealing of weights and measures for the one month of June, were ₱185.24.

PAIL-CONSERVANCY SYSTEM—WATER SYSTEM—BUILDING PERMITS—BOILER INSPECTION—CLEANING VAULTS.

The collection of the rents, fees, etc., pertaining to the above was transferred to this department June 1, 1904, from the Department of Engineering and Public Works, by virtue of Act No. 1141. The undersigned has no administrative control over the above, but makes the collections upon orders from the offices of the several superintendents concerned. The receipts from these sources for the month of June were:

Pail-conservancy system.....	₱1,790.04
Building permits.....	1,311.59
Boiler inspection.....	456.00
Cleaning vaults	159.29
Total.....	3,716.92

No collections were made on account of the water system for the reason that no water rents fell due during the short period said rents were payable at this office.

MUNICIPAL COURT COSTS, FINES, AND FEES—SHERIFF'S FEES—JUSTICE-OF-THE-PEACE FINES AND FEES—CITY ATTORNEY'S FEES—BOARD-OF-HEALTH FEES—POUND RECEIPTS—REGISTRATION OF COCHEROS—CITY ELECTRICIAN'S FEES.

These costs, fines, fees, etc., were received from the several officials charged with their collection, under the provisions of section 61 of

the Manila Charter. The amounts received from these sources during the year were as follows:

Source.	1904.	1903.
Municipal Court fines and fees	P151, 971. 31	P125, 383. 74
Sheriff's fees	11, 489. 99	7, 133. 78
Justice-of-the-peace fines and fees	4, 825. 60	3, 798. 78
City Attorney's fees	34. 22	219. 08
Board of health fees	15, 619. 67	8, 130. 66
Pound receipts	4, 357. 74	1, 883. 32
Registration of cocheros	376. 85	2, 238. 30
City Electrician's fees	3, 955. 60	3, 347. 62
Total	192, 630. 98	152, 135. 28

The registration of cocheros was abolished during the month of August, 1903, which accounts for the falling off in receipts from that source.

SALES OF CITY LAND.

During the fiscal year covered by this report there was realized the sum of P5,460.39 on account of sales of city land, as follows:

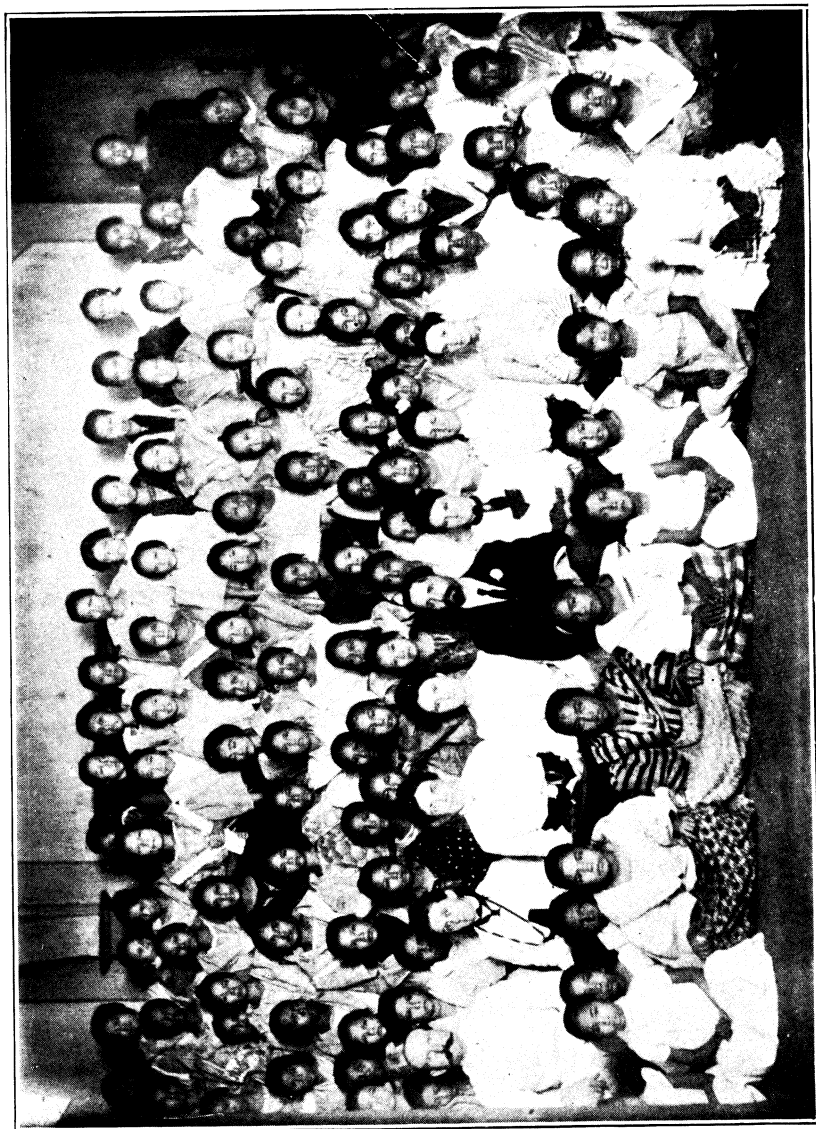
Manuel Sotuico	P966. 00
Rafael Reyes and Abelardo Lafuente	3, 098. 00
Salvador Vistan	66. 00
Valeriano Alonso and Valeriana de los Santos	390. 66
M. C. Tan Quentin	492. 73
Fernando Zamora	59. 00
Edward Cook	100. 00
Malate police mess	288. 00
Total	5, 460. 39

MISCELLANEOUS COLLECTIONS.

As a matter of course there are a few stray collections that can not very well be classified to correspond with any of the regular subjects. These collections aggregated P5,303.65, and were as follows:

Source.	Mexican currency.	Philippine currency.
Martin Fernando, for the privilege of operating a line of small ferry boats between Santa Ana and San Felipe Neri for the fiscal year ending June 30, 1904.	\$184. 00	P20. 00
Manila Telephone Company, 7 per cent of gross earning for the fourth quarter, fiscal year 1903, and first and second quarters, fiscal year 1904 ¹	1, 319. 65	2, 007. 20
Chief of Police, funds derived from sale of confiscated goods	450. 38	1, 486. 31
Disbursing officer, board of health, funds pertaining to case of August Carlson, deceased, deposited by order of Court of First Instance, Manila, P. I.	17. 00	8. 00
City Assessor and Collector, funds derived from sale of condemned property		63. 85
Sheriff of Manila, funds derived from sale of condemned property		1. 50
Total	1, 971. 03	3, 586. 86
\$1,971.03, Mexican, reduced to Philippine currency at rate in which collected, equals		1, 716. 79
Total collections		5, 303. 65

¹ The missing quarterly payment in the second item is explained by its having been accidentally treated as an industrial-tax payment, and is included in the collections under that head.



SANTA CRUZ GIRLS' NIGHT SCHOOL.

PERSONNEL.

The authorized force of the department on July 1, 1903, was 160, consisting of the City Assessor and Collector and deputies, superintendents, clerks, collectors, draftsmen, laborers, etc., of whom 30 were Americans and 130 were natives. On January 1, 1904, this number was reduced by two Americans and one native. There was also authorized an emergency force of ten building inspectors who were employed from December 7, 1903, to January 6, 1904, at a salary of ₱40 per month each.

The amount appropriated for salaries and wages averaged ₱13,630 per month. The monthly payroll averaged ₱12,306.67, or ₱1,323.33 less than it would had the full authorized force been employed.

During the year there were 41 original appointments, two reinstatements, seven transfers to the department, seven transfers from the department, and 42 separations, of which 23 were by resignation, 17 by discharge, and two by death. Two employees were, upon the recommendation of the City Assessor and Collector, separated from the service for absence without leave.

Leaves of absence were granted as follows: Six hundred and ninety-five days' sick or vacation leave granted to 126 employees; 108 days' absence without pay granted to two employees; 520 days' accrued leave granted to 58 employees; and there were ten days' absence without leave. Both the Chief Deputy Assessor, Captain Steere, and the Chief Deputy Collector, Captain Cromwell, were on leave during the year with authority to visit the United States.

TOTAL COLLECTIONS.

Through the office of City Assessor and Collector all the revenues of the city are collected. The condensed statement below furnished by the cashier, Mr. Charles B. Weltner, will therefore be of greatest interest, and will suffice as a general summing up of the receipts from the various sources hereinbefore commented upon. This said statement shows increased receipts over 1903 to the amount of ₱910,629.29, and is as follows:

Statement of collections.

Source of revenue.	Total collections, fiscal year 1904.	Total collections, fiscal year 1903.	Estimated collections, fiscal year 1905.
Land tax	₱1,713,214.98	₱1,168,292.84	₱1,000,000.00
Industrial tax	609,479.75	461,658.04	-----
Stamp sales	166,067.95	133,164.78	-----
Certificates of registration	91,426.37	104,177.58	90,000.00
Matadero tax	175,645.34	140,491.28	175,000.00
Market tax	285,875.47	218,048.92	300,000.00
Licenses	357,366.89	329,640.90	-----
Live-stock registration	1,108.77	1,013.42	1,000.00
Vehicle tax	51,549.11	41,905.52	55,000.00
Vehicle equipment	2,526.83	2,634.40	2,000.00
Municipal Court fines	151,971.31	125,383.74	160,000.00
Justice-of-peace fees	4,825.60	3,798.78	5,000.00

Statement of collections—Continued.

Source of revenue.	Total collec- tions, fiscal year 1904.	Total collec- tions, fiscal year 1903.	Estimated collec- tions, fiscal year 1905.
Sheriff's fees -----	P11,489.99	P7,133.78	P10,000.00
Rents -----	15,817.37	9,018.36	16,000.00
Miscellaneous -----	5,303.65	4,632.78	5,000.00
Certificates of installation -----	3,955.60	3,347.62	4,000.00
Pound receipts -----	4,357.74	1,883.32	4,000.00
Registration of cocheros -----	376.85	2,238.30	
Public-health fees -----	15,619.67	8,130.66	15,000.00
Fees, Secretary Municipal Board -----	67.50		100.00
Fees, City Attorney -----	34.22	219.08	200.00
Sales city land -----	5,460.39		5,000.00
Weights and measures -----	185.24		2,500.00
Pail system -----	1,790.04		20,000.00
Building permits -----	1,311.59		20,000.00
Cleaning vaults -----	159.29		3,000.00
Water rents -----			300,000.00
Boiler inspection -----	456.00		6,000.00
Total -----	3,677,443.51	2,766,814.22	

Each day's collections are deposited the following morning, and in the kind of money received, with the Insular Treasurer.

The total amount so deposited was P2,827,692.29, Philippine currency, and \$896,197.50, Spanish-Filipino currency.

TOTAL EXPENSES.

Following is a statement showing the expense for the past year, subdivided to correspond with the appropriations made for this department:

How incurred.	Total ex- penses, fiscal year 1904.	Total ex- penses, fiscal year 1903.	Estimate of expenses, fiscal year 1905.
Regular supplies, Insular Purchasing Agent -----	P5,495.86	P6,842.39	P5,984.80
Incidental expenses -----	1,167.46	944.88	720.00
Printing and binding -----	8,157.80	11,871.87	8,656.00
Transportation -----	1,290.27	854.94	1,668.00
Tax refunds -----	4,522.80	1,433.94	3,000.00
Salaries and wages -----	147,679.99	142,540.96	166,080.00
Total -----	168,314.18	164,488.98	186,108.80

It is expected that along with the annual statement showing the revenue gathered in from each source, an estimate of the probable collection for the ensuing year will also be shown. This in part has been done in the foregoing statement, but certain sources of revenues—that is, licenses, industrial taxes, and stamp sales—will be so affected by the new internal-revenue law that not even a guess could be safely ventured. For that reason no estimates have been made under the above-mentioned heads.

As will be observed from the foregoing statement, an increase of receipts is shown from nearly every source of revenue and a total gain of P910,629.29 over the collection for 1903. Also, an increase in the expenses of P3,825.20. A considerable portion of the increased receipts is accounted for, as before stated, by the greater worth of the money

in which the taxes were collected during the first half of the year, and by Act No. 1032, making all dues imposed in Mexican currency payable in Philippine currency after January 1, 1904. But the larger part of said increase is accounted for by the fact that all of the real-estate tax for 1903 and one-half of the tax for 1904 became due and payable within the fiscal year 1904.

There has, nevertheless, been a substantial increase of business all along the line.

The total collection, however, falls somewhat short of the amount estimated in our last annual report. This is accounted for by the reduction by the Philippine Commission of the tax levy upon real estate for 1903 from 2 per cent to $1\frac{1}{2}$ per cent; which on the total assessed valuation of, say, \$37,000,000, would amount to ₱370,000 in round numbers.

The variety of lines of public service covered by this office would in most cities in the States go to make up three separate and distinct public offices, and we are soon to become the collection agency for the Insular Government of all internal-revenue taxes imposed within the city of Manila. All of these lines reach out for the pocketbook of the individual, and it would be strange indeed if at times it did not lead us into trouble. In spite of our troubles and many annoyances incident to the work we do not mean that the public shall have cause for complaint through the lack of just, fair, and courteous treatment. Every employee in this department coming in contact with the public is enjoined to serve all alike and with promptness and courteousness, whether rich or poor, brown or white. It is our belief that the public has little cause for complaint along this line. The cheerfulness with which the large majority of the taxpayers make their contributions is certainly worthy of remark, and the fact is most fully appreciated and goes far toward leading one to forget some of the annoying phases of the service. The writer doubts if there is another city of this size on the face of the globe where the people pay their public dues more promptly and with so little "kicking" as do the people here in the city of Manila.

In response to suggestions made in our last annual report your honorable Board caused to be made extensive alterations and repairs in and to the building occupied by this department. Said alterations and repairs were made under the direct supervision of Captain Dorington, your superintendent of public buildings, who planned so well that the improvement made is far beyond anything we had anticipated, and you may feel assured that the public, as well as every employee connected herewith, appreciates to the fullest degree the better conditions afforded by the changes wrought.

By the tearing away of no less than a dozen partitions, thus throwing

practically all the small rooms that formerly made up the office into one large office room, with an abundance of light and thorough circulation of air, we have one of the best offices to be found in the city. All join in returning thanks for your generous consideration for our comfort and convenience.

Respectfully submitted.

A. W. HASTINGS,
City Assessor and Collector.

The MUNICIPAL BOARD, *Manila, P. I.*

EXHIBIT A.—*Assessed valuation of taxable real estate, city of Manila, 1903.*

District.	Value of land.	Value of improvements.	Total.
Intramuros	\$1,284,593	\$2,330,109	\$3,614,702
Binondo	6,402,432	3,010,843	9,413,275
San Nicolas	3,822,164	2,509,005	6,331,169
Santa Cruz	1,682,987	2,022,465	3,705,452
Quiapo	1,167,090	960,010	2,127,100
San Miguel	1,569,080	774,865	2,343,945
Sampaloc	1,037,759	545,140	1,582,899
San Lazaro estate		164,970	164,970
Tondo	1,225,094	554,130	1,779,224
Ermita	2,038,830	805,930	2,844,760
Malate	1,037,924	263,095	1,301,019
Paco	911,379	412,546	1,323,925
Pandacan	142,648	28,755	171,403
Santa Ana	299,434	100,300	399,734
Total	22,621,414	14,482,163	37,103,577

EXHIBIT B.—*Assessed valuation of taxable real estate, city of Manila, 1904.*

District.	Value of land.	Value of improvements.	Total.
Intramuros	\$1,074,360	\$1,437,004	\$2,511,364
Binondo	6,241,999	3,046,930	9,288,092
San Nicolas	3,818,796	2,694,729	6,513,525
Santa Cruz	1,684,088	2,166,835	3,850,923
Quiapo	1,165,541	1,040,166	2,205,707
San Miguel	1,566,514	914,667	2,481,181
Sampaloc	1,038,292	760,056	1,798,348
San Lazaro estate		229,085	229,085
Tondo	1,233,627	748,931	1,982,558
Ermita	2,000,710	1,135,037	3,135,747
Malate	1,018,419	357,965	1,376,384
Paco	911,543	537,537	1,449,080
Pandacan	142,617	26,781	179,398
Santa Ana	298,804	107,572	406,376
Total	22,195,310	15,212,458	37,407,768

EXHIBIT C.—Statement of properties exempt from taxation in the city of Manila, June 30, 1904.

RECAPITULATION.

[Plazas wholly used by public shown separately.]

District.	Army.	Insular.	City.	Roman Catholic Church.	Roman Catholic orders.	Protestant Church.	Miscellaneous.	Undetermined.	Total by districts.
Intramuros	\$1,213,750	\$1,716,988	\$671,070	\$1,072,191	\$3,839,619		\$4,742	\$1,000,086	\$10,118,446
Binondo	165,548	343,348	166,458	326,685					1,002,039
San Nicolas	217,685	1,066,167	438,170	836					1,722,858
Santa Cruz		1,774,006	209,944	455,246		\$1,000	29,464		2,469,660
Quiapo			56,214	40,510	591,172				687,896
San Miguel		226,022	1,749	488,693					716,464
Sampaloc		2,135	40,000	95,922					158,057
Tondo	20,000		174,239	122,287		15,576			312,102
Ermita	1,516,899	1,223,288	764,587	75,086	274,913	27,386		345,756	4,227,915
Melate	383,535	21,353	88,664	103,623		757			597,932
Paco	11,000	340	102,231	224,040					337,611
Pandacan				17,361					17,361
Santa Ana				128,272					128,272
Total of city, by class	3,528,417	6,373,647	2,713,326	3,150,752	4,705,704	44,719	34,206	1,945,842	22,496,613

BY DISTRICT.

Location.	Lot.	Block.	Superficial area.	Value of land.	Value of improvements.	Total valuation.	Remarks.
<i>Intramuros.</i>							
ARMY.							
Land and Improvements on Calle Santa Clara and Hospital.		6	17,601.30	\$86,190	\$148,200	\$234,390	Arsenal.
Land and Improvements on Plaza Moriones		7	18,072.27	190,163	83,000	273,163	Fort Santiago.
Land and Improvements on Calle Arzobispo		18	2,885.84	14,882	4,000	18,882	7 accessories occupied by employees of arsenal.
Land and Improvements on Calle Santa Lucia	1	21	2,885.00	18,462	7,400	25,862	Used by city for stables.
head of Anda.							Do.
Land on Calles Anda and Santa Lucia	4	22	241.14	1,539		1,539	Formerly part of Engineers.
Land and Improvements on Calles Palacio, Santa Potenciana, and Cabilido.	1	47	5,636.45	29,411	58,200	87,611	Used by Board of Health.
Land and Improvements on Calle Santa Potenciana.	5	48	2,105.13	12,273	700	82,278	

EXHIBIT C.—Statement of properties exempt from taxation in the city of Manila, June 30, 1904—Continued.

BY DISTRICT—Continued.

Location.	Lot.	Block.	Superficial area.	Value of land.	Value of improvements.	Total valuation.	Remarks.
<i>Intramuros</i> —Continued.							
ARMY—continued.							
Land and improvements on corner Calles Santa Lucia and Victoria.	1	50	780.83	\$5,356	\$33,000	\$68,356	Formerly pony corral; now used by Constabulary.
Land and improvements on Calles Santa Lucia and Victoria near Jesuit Convent.	2	51	2,474.92	10,799	39,800	50,599	The old cavalry barracks; now used by Army.
Land and improvements on Calles Victoria, Palacio, and Fundicion.	1, 2, 3, 4	52	25,986.20	116,225	124,850	241,075	Cuartel de España, officers' quarters and warehouses.
Improvements on land of insular quartermaster buildings.					160,000	160,000	16 large warehouses; offices land and water transportation, \$110,000; stables, shops, \$50,000.
Total Army				485,300	728,450	1,213,750	
INSULAR.							
Land and improvements on Plaza España.		4	3,181.20	18,190	128,425	146,615	Intendencia.
Land on Pasig River.		5	13,389.63	239,018		239,018	Northwest of Intendencia.
Land and improvements on Calles Arzobispo, Claveria, and Audiencia.	3	9	1,728.10	9,596	8,000	17,596	Signal station.
Land fronting on Plaza McKinley.		17	6,190.40	34,082		34,082	Covered by foundation.
Land and improvements on Calles Arzobispo, Postigo, and Palacio.	1	20	3,202.95	16,572	50,000	66,572	Supreme Court building.
Land, San Lazaro estate on Calle San Juan de Dios, Nos. 107-109.	4	42	478.54	2,000		2,000	Improvements owned by José Fernandez.
Land, San Lazaro estate on Calle San Juan de Dios, No. 115.	5	42	593.30	2,556		2,556	Improvements owned by heirs of Juan Aenlle.
Land, San Lazaro estate on Calle San Francisco, No. 25.	6	42	465.92	2,194		2,194	Improvements owned by heirs of Albino Goyenechea.
Land and improvements San Lazaro estate on Calle San Francisco, No. 17.	7	42	317.43	1,245	5,000	6,245	
Land, San Lazaro estate on Calle Real, No. 168.	11	42	436.68	3,592		3,592	Improvements owned by José Varela.
Land, San Lazaro estate on Calle Solana, No. 190.	12	42	288.27	1,495		1,495	Improvements owned by Ricardo A. Figueroa.
Land, San Lazaro estate on Calle Solana, No. 196.	13	42	408.05	2,268		2,268	Improvements owned by Carmen Linart.
Land, San Lazaro estate on Calle Solana, No. 202.	14	42	1,164.55	6,136		6,136	Improvement owned by Edwin Case (the Hotel de France).
Land and improvements, San Lazaro estate on Calle Victoria, No. 157.	13	45	220.50	966	1,500	2,466	
Land and improvements on Calle Cabildo.	8	56	2,153.57	9,429	60,000	69,429	Formerly the mint.

Land and improvements on Pasig River and Malecon Drive.	150,100.99	1,054,324	60,450	1,114,774	Improvements on Engineer Island, office of chief engineer and buildings used by works of the port.
Total insular			313,375	1,716,988	Used by Ordnance Department, United States Army.
CITY.					Ayuntamiento.
Land on Calle Santa Clara	8	13,305.39	43,122	43,122	For detention of insane.
Improvement, fire engine station	3			8,950	Market.
Land and improvements fronting on Plaza McKinley	1	5,583.48	32,303	282,303	Improvements owned by heirs of Santos Obin.
Land and improvements on Calle Postigo corner Arzobispo	19	727.20	3,712	9,712	Improvements owned by Mercedes Cabezudo.
Land and improvements on Calles Anda and Solana	7	1,402.60	7,687	25,687	Improvements owned by heirs of Enrique Rodriguez Franco.
Land on Calle Legaspi, No. 40	3	250.86	1,488	1,488	Improvements owned by Eduardo Alcantara.
Land on Calle Legaspi, No. 46	4	249.37	1,140	1,140	Improvements owned by Juan Garcia y Arre-lano.
Land on Calle Legaspi, No. 52	5	1,115.09	4,593	4,593	Improvements owned by Mercedes Cabezudo.
Land on Calle San Juan de Letran, Nos. 69-73	8	416.00	2,661	2,661	Improvements owned by Vicenta y Trinidad Morillo.
Land on Calle San Juan de Letran, No. 75	9	427.30	2,723	2,723	Vacant lot; former building torn down.
Land on Calle Legaspi, No. 58	11	384.19	1,624	1,624	Improvements owned by corporation of Dominicans.
Land on Calle Legaspi, No. 60	12	373.00	1,579	1,579	Improvements owned by Obras Pias de la Sagrada Mitra.
Land on Calle Legaspi, No. 68	13	192.56	821	821	Improvements owned by Municipal School.
Land on Calle Legaspi, No. 66	18	244.00	1,044	1,044	Used by Insular Government for lumber and coal yard.
Land fronting on Calle Legaspi, No. 51	6	662.13	2,834	2,834	
Land on Calle Legaspi, Nos. 55-57	7	662.13	2,290	2,290	
Land and improvements on Calle Victoria	58	5,265.98	21,337	41,337	
Land on Pasig River		14,976.75	237,162	237,162	
Total city			363,120	671,070	
ROMAN CATHOLIC CHURCH.					
Land and improvements on Calle Solana	1	3,837.56	22,566	97,566	College of Santa Rosa.
Land and improvements on Calle Cabildo, No. 126	2	660.39	3,839	7,839	Parish house of Cathedral.
Land and improvements on Plaza McKinley	16	4,276.00	27,760	377,760	Cathedral.
Land and improvements on Calle Palacio, No. 73	2	1,849.67	11,460	27,460	A school (Obras Pias de la Sagrada Mitra).
Land and improvements on Calle Arzobispo, No. 151	2	1,677.92	7,467	22,467	Seminary (Obras Pias de la Sagrada Mitra).
Land and improvements on Calle Anda, No. 100	4	2,312.07	15,977	50,977	College of San José.
Land and improvements on Calles Real, Arzobispo, Anda, and Palacio.	35	8,311.37	49,783	199,783	Santa Isabel College.

EXHIBIT C.—Statement of properties exempt from taxation in the city of Manila, June 30, 1904—Continued.

BY DISTRICT—Continued.

Location.	Lot.	Block.	Superficial area.	Value of land.	Value of improvements.	Total valuation.	Remarks.
<i>Intramuros</i> —Continued.							
ROMAN CATHOLIC CHURCH—continued.							
Land and improvements on Calle Real	43		8,359.97	\$40,841	\$200,000	\$240,841	Hospital San Juan de Dios.
Land and improvements on Calle Santa Lucia Nos. 197-183.	51		4,000.85	17,498	30,000	47,498	Sisters of the Company of Jesus.
Total Roman Catholic Church.				197,191	875,000	1,072,191	
ROMAN CATHOLIC ORDERS.							
Land and improvements on Calle Beaterio	1	1	6,192.26	30,417	237,500	267,917	College, Dominicans.
Land and improvements on Calles Beaterio and Letran.		2	6,119.50	28,983	225,000	253,983	Do.
Land and improvements on Calle Muralla and Plaza España.		3	12,747.52	60,696	983,334	1,044,030	Church and convent, Dominicans.
Land and improvements on Calle Hospital, No. 47.	1	11	1,015.57	5,350	1,500	6,850	Warehouses and servants' quarters, Monastery of Santa Clara.
Land and improvements on Calle Hospital	1	12	8,008.16	32,872	100,000	132,872	Monastery of Santa Clara.
Land and improvements on Calle Solana	2	13	6,239.60	29,025	250,000	279,025	College, Dominicans.
Land and improvements on Calle Arzobispo, No. 143.	3,1	22, 36	8,324.58	39,551	350,000	389,551	Church, convent, and school, Jesuits.
Land and improvements on Calles Real and Palacio.		37	20,265.65	110,557	575,000	685,557	Church, convent, and school, Agustinos.
Land and improvements on Calle Solana.	1	44	17,739.50	61,945	175,000	236,945	Church, convent, and school, Franciscanos.
Improvements on Calle Solana	2	44			75,000	75,000	Church, convent, and school, Third Order Franciscanos.
Land and improvements on Calle Palacio	6	53	1,585.22	9,413	15,000	24,413	Church, convent, and school, Capuchinos.
Land and improvements on Calle Cabildo	1	55	11,204.52	43,476	400,000	443,476	Church, convent, and school, Recoletos.
Total Roman Catholic orders				452,285	3,387,334	3,839,619	
MISCELLANEOUS.							
Land and improvements on Calle Muralla	18	28	205.48	742	4,000	4,742	Telephone Company.
UNDETERMINED.							
Land covered by the walls, the glacis, and other defenses about Intramuros.			343,320.00	1,170,086		1,170,086	

[illegible]

EXHIBIT C.—Statement of properties exempt from taxation in the city of Manila, June 30, 1904—Continued.

BY DISTRICT—Continued.

Location.	Lot.	Block.	Superficial area.	Value of land.	Value of improvements.	Total valuation.	Remarks.
<i>Binondo—Continued.</i>							
ROMAN CATHOLIC CHURCH.							
Land and improvements on Plaza Calderon de la Barca.	2	54	4,485.00	\$176,685.00	\$150,000	\$326,685	Binondo Church and convent.
Total Binondo						1,002,039	
<i>San Nicolas.</i>							
ARMY.							
Land and improvements		69	10,231.48	179,585.00	38,100	217,685	Quartermaster shops.
INSULAR.							
Land on Muelle de la Reina.	2	46	571.00	9,482		9,482	Coal pile.
Land and improvements fronting on Pasig River.	5	69	950.60	17,931		21,931	Coast Guard and Transportation.
Land and improvements fronting on Pasig River.		70	29,180.00	526,503	4,000	821,503	Custom-house and bodegas.
Land and improvements on Pasig River			10,016.75	99,151	114,100	213,251	Light-house, dry dock, shops, etc., works of port.
Total Insular				653,067	413,100	1,066,167	
CITY.							
Land and improvements on Calle Santo Cristo		1	7,970.40	160,232	155,000	315,232	Divisoria Market.
Land and improvements on Calles Principe and Valderrama and Manila Bay.		10	1,526.20	6,633	5,919	12,752	Tenement house.
Land and improvements on Calle Asuncion, No. 72.		37	221.01	1,688	4,000	5,688	Native police station.
Land and improvements on Calle San Fernando.	3	55	562.50	9,478	7,500	16,978	Chinese school.
Land and improvements on Calles Numancia and San Fernando.	2	69	1,247.01	20,631	8,000	28,631	Police station.
Improvements on Calle San Fernando		69			17,925	17,925	Fire engine station.
Land on Calles Tabora and Aceyteros	1	82	3,440.87	10,977		10,977	Improvement of house, owned by Tan Auco.
Land on corner Calles Barcelona and Gabriel de Rivera.	1	94	99.68	398		398	Improvement, 2 shacks, private owners.
Land and improvements on Paseo de Azcarraga	1	100	2,976.00	15,769	12,500	28,269	Matadero.
Midden sheds, various locations					1,500	1,500	
Total city				225,826	212,344	438,170	

ROMAN CATHOLIC CHURCH.						
Land and improvements on Calle Soledad near matadero building.						
Total San Nicolas	2	100	151.20	336	500	836
Santa Cruz.						
INSULAR.						
Land of San Lazaro estate	SLE.					1,231,494
Improvements on Calzada Bilibid	13		1,478,208.74	1,231,494	282,712	282,712
Improvements on Calle Cervantes	32				259,800	259,800
Total Insular				1,231,494	542,512	1,774,006
CITY.						
Land and improvements on Calles San Pedro and Palma.	2	6	355.80	2,002	3,200	5,202
Land on Calles Dulumbayan and Salcedo.	2	22	161.95	597		597
Land on Calle Almanza, No. 18	3	54	113.96	242		242
Land and improvements on corner Calles Alcala and Enrile.	11	58	1,201.50	5,245	25,400	30,645
Land and improvements on corner Calles Arranque and Paz.	3	63	1,426.76	8,022	14,200	22,222
Land on corner Calles Paz and Arranque	8	78	240.06	1,529		1,529
Land and improvements on corner Calles Crespo and Villalobos.	1	79	154.80	1,949	4,000	5,949
Land and improvements on Calle Echague.		80	4,900.00	63,228	67,000	130,228
Land and improvements between blocks 1 and 2			527.00	2,157	1,000	3,157
Land between Calles Dulumbayan, Salcedo, and blocks 21 and 22.			289.36	883		883
Cemetery of Santa Cruz.			42,900.00	4,290	5,000	9,290
Total city				90,144	119,800	209,944
ROMAN CATHOLIC CHURCH.						
Land and improvements on Plaza Miranda	10	4	4,819.50	51,595	75,000	126,595
Land and improvements on Calle Cervantes	SLE.	45	1,792.00	2,688	2,500	5,188
Land and improvements on Plaza Santa Cruz.	7	51	5,418.00	223,463	100,000	323,463
Total Roman Catholic Church				277,746	177,500	455,246
Bilbid Prison. San Lazaro contagious and pest hospital, morgue, stables (Insular Purchasing Agent), Board of Health, and other buildings.						
Boys' School. Vacant lot. Improvement, 1 house, owned by Fernando Francisco. Headquarters Fire Department. Arranque Market. Improvement, 1 house, owned by Calixto Dy Anco. Girls' School. Quinta Market. Storage shed. A building lot, but used as a street. Outside city limits.						
Quiapo Church and convent. Cemetery and chapel. Santa Cruz Church and convent.						

Bilibid Prison.
San Lazaro contagious and pest hospital, morgue,
' stables (Insular Purchasing Agent), Board of
Health, and other buildings.

Boys' School.
Vacant lot.
Improvement, 1 house, owned by Fernando
Francisco.
Headquarters Fire Department.
Arranque Market.

Improvement, 1 house, owned by Calixto Dy
Anco.
Girls' School.
Quinta Market.
Storage shed.
A building lot, but used as a street.
Outside city limits.

Quiapo Church and convent.
Cemetery and chapel.
Santa Cruz Church and convent.

EXHIBIT C.—Statement of properties exempt from taxation in the city of Manila, June 30, 1904—Continued.
BY DISTRICT—Continued.

Location.	Lot.	Block.	Superficial area.	Value of land.	Value of improvements.	Total valuation.	Remarks.
<i>Santa Cruz</i> —Continued.							
PROTESTANT CHURCH.							
Improvements on Calle Cervantes interior	SLE.				\$1,000	\$1,000	Church.
MISCELLANEOUS.							
Land and improvements on Calle Dulumbayan, No. 208.	22	59	1,427.44	\$4,464	25,000	29,464	School (Society Filomatica).
Total Santa Cruz.						2,469,660	
<i>Quiapo.</i>							
CITY.							
Land and improvements on Calles Romero Aquino and Concordia	1	8	1,214.40	9,348	30,500	39,848	Fire engine station and sheds.
Land on Calle Concordia	2	8	653.51	2,165		2,165	Vacant lot.
Land on Calle Romero Aquino on west side of block.	10	8	722.23	5,570		5,570	Improvement, 1 house, owned by Pereyra Apolina; includes strip running through to Calle Concordia.
Land on Plaza del Carmen and Estero of San Sebastian.		9	696.95	3,586		3,586	Improvement, 1 house, owned by Jose Jimenez.
Land on Calle Bilibid	33	10	171.49	431		431	Vacant lot.
Land on Calles Bilibid and San Sebastian.		10	809.60	1,065		1,065	Together with swamp land in rear; latter not surveyed.
Land on Estero San Miguel adjoining Puente Quinta on south.	8	49	337.45	3,549		3,549	Vacant lot.
Total city				25,714	30,500	56,214	
ROMAN CATHOLIC CHURCH.							
Land and improvement on Calle San Sebastian, Nos. 284-290.	10	9	2,411.05	15,510	25,000	40,510	School and convent (Obras Pias de Mitra).
ROMAN CATHOLIC ORDERS.							
Land and improvements on Calle San Sebastian	11	4	34,460.94	81,472	500,000	581,472	The Steel Church (Recoletos).

Land and improvements on Calle Balmes-----	14	29	4, 000. 00	6, 200	3, 500	9, 700	Church and convent (Benedictinos).
Total Roman Catholic orders-----				87, 672	503, 500	591, 172	
Total Quiapo-----						687, 896	
<i>San Miguel.</i>							
INSULAR.							
Land and improvements on Calle Malacañan and Pasig River.	4	13	24, 326. 00	126, 022	100, 000	226, 022	Governor's Palace.
CITY.							
Land on Calle Alix and Estero of Sampaloc-----	3	30	284. 23	1, 749		1, 749	Vacant lot.
ROMAN CATHOLIC CHURCH.							
Land and improvements on Calle San Miguel, No. 249.		19	108. 00	882	750	1, 632	Chapel.
Land and improvements on Calle General Solano and Malacañan.	1	28	4, 884. 00	26, 480	20, 000	46, 480	San Miguel Church and convent.
Land and improvements on Pasig River, Convalecencia Island.		38	36, 392. 00	190, 581	250, 000	440, 581	Hospital San José.
Total Roman Catholic Church-----				217, 943	270, 750	488, 693	
Total San Miguel-----						716, 464	
<i>Sampaloc.</i>							
ARMY.							
Santa Mesa, improvements on rented land-----		5			20, 000	20, 000	Barracks, quarters, stables, etc.
INSULAR.							
Two pieces of land between haciendas Santa Clara and Nagtajan.	SLE.	1	35, 586. 00	2, 135		2, 135	Part of San Lazaro estate.
CITY.							
Cemetery del Norte-----			500, 000. 00	20, 000	20, 000	40, 000	Outside city limits.
ROMAN CATHOLIC CHURCH.							
Land and improvements in Barrio Balic Balic-----		1	10, 000. 00	500	2, 000	2, 500	Cemetery.
Land and improvements on Calles San Anton and Naurique.		11	8, 781. 00	18, 422	75, 000	93, 422	Sampaloc Church and convent.
Total Roman Catholic Church-----				18, 922	77, 000	95, 922	
Total Sampaloc-----						158, 057	

EXHIBIT C.—Statement of properties exempt from taxation in the city of Manila, June 30, 1904—Continued.

BY DISTRICT—Continued.

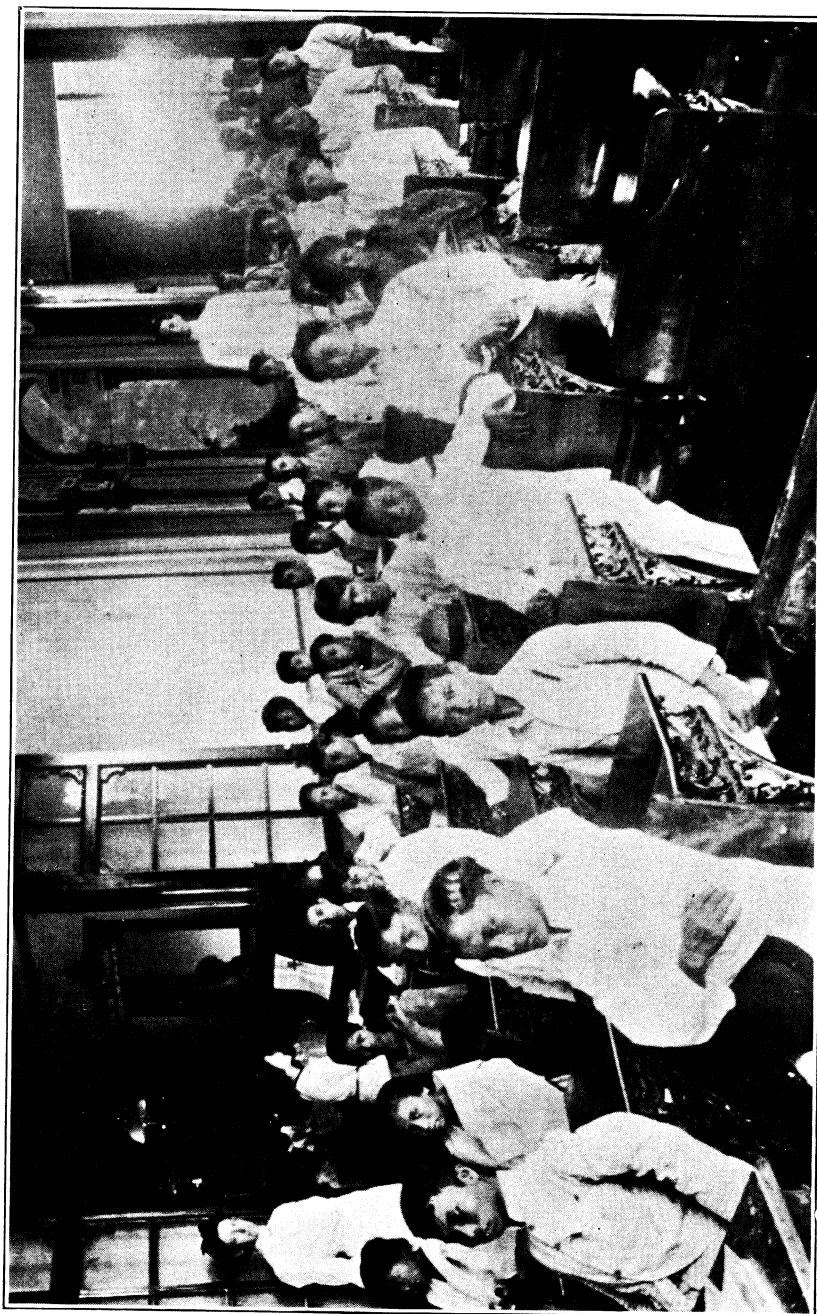
Location.	Lot.	Block.	Superficial area.	Value of land.	Value of improvements.	Total valuation.	Remarks.
<i>Tondo.</i>							
CITY.							
Land and improvements on Island of Palomar	1	10	20,107.42	\$50,269	\$94,000	\$144,269	City stables, crematory, and pound.
Land on Paseo Azarraga and Estero, Tutuban		11	2,717.95	14,580		14,580	Vacant lot.
Land and improvements on Calle Reina Regente between Calles Morones and Ricafort.		30	1,115.29	1,115	1,500	2,615	House and wharf, pail system.
Land on Morga between Calle Lemery and Calle Santiago de Cuba	25	39	929.49	930		930	Vacant lot.
Land corner Calle Sande and Lorenzo Chacon	13	42	1,589.24	1,590		1,590	Fire engine station under construction.
Land interior Calle John Soliman on beach	27	45	2,417.95	1,208		1,208	Improvements, numerous shacks, private owners.
Improvements on Calle Gagalangin		82			1,247	1,247	School on rented land.
26 midden sheds, various locations					7,800	7,800	
Total city				69,692	104,547	174,239	
ROMAN CATHOLIC CHURCH.							
Land and improvements on Calle Sande		18	10,147.50	4,813	1,500	6,313	Cemetery and chapel.
Land and improvements on Plaza Leon XIII		46	9,000.00	14,468	100,000	114,468	Tondo Church and convent.
Land on Calle Encarnacion		68	108.00	108		108	Chapel site.
Land on Calle Salinas		69	153.21	258		258	Do.
Land and improvements on Calle Gagalangin		81	500.00	140	1,000	1,140	Chapel.
Total Roman Catholic Church				19,787	102,500	122,287	
PROTESTANT CHURCH.							
Land and improvements on Paseo Azarraga corner Pescadores.	10, 11	70	776.66	3,576	12,000	15,576	Presbyterian Church.
Total Tondo						312,102	
<i>Ermita.</i>							
ARMY.							
Land and improvements on Calle Arroceros and Pasig River.		5	20,511.86	147,791	113,450	261,241	Estado Mayor, Signal Corps, and commissary warehouse.
Land and improvements on Calles Arroceros and Concepcion.		9	42,271.35	301,099	136,500	457,599	First Reserve Hospital.

Improvements	12					7,400	Medical laundry.
Do	13					43,250	Army morgue and quartermaster warehouse.
Do	13					8,050	Headquarters Post of Manila.
Improvements east side Nozalea	13					34,500	Officers' quarters.
Land and improvements on Calzada Bagumbayan, Luncá, San Luis, and Nozalea.	14		145,112.42	622,959		704,859	The old Third Reserve Hospital officers' quarters on west side, Nozalea and Pavilion.
Total Army				1,071,849		1,516,899	
INSULAR.							
Land and improvements on Plaza Lawton	1		79,594.37	127,034		192,334	Post-office, old Cuartel Fortin.
Land and improvements on Calle Arroceros and Pasig River.	2		15,222.00	213,683		463,683	Ice plant.
Land and improvements on Calzada Bagumbayan and Calle Concepcion.	8		10,541.25	94,139		179,139	Bureau of Public Printing.
Improvements on Calzada Bagumbayan	13					3,000	Cottage in rear city hall.
Improvements on Calle Nozalea	13					1,400	Yard, Bureau of Architecture.
Land and improvements on Calles Padre Faura and Herran.	47		75,612.98	142,632		208,732	Exposition buildings, stables and shops.
Improvements	47					175,000	Insular Laboratory; no record of transfer to Government of the land.
Total insular				577,488		1,223,288	
CITY.							
Land and improvements on Plaza Lawton and Pasig River.			5,831.63	92,922		94,422	West of post-office.
Land and improvements on Calzada Bagumbayan, Arroceros, and Plaza Lawton.	3, 4, 6, 7		47,110.00	438,417		441,517	Botanical Gardens.
Land and improvements on Calle Arroceros	9		9,306.75	67,045		96,745	City shops.
Improvements on Calzada Bagumbayan	13					72,738	City hall; title of land undetermined.
Land adjoining Exposition Grounds on Calle Herran.	47		24,760.09	34,044		34,044	Occupied by old barracks in ruinous condition.
Land on the sea near Cuartel Malate	3		343.60	1,718		1,718	Improvement, 1 stable, owned by F. Hilbert.
Grass land between Calles Nozalea and San Marcelino on estero.	21		18,911.03	14,183		14,185	Improvements, numerous shacks, by private owners.
Land and improvements on Calles Nozalea and Padre Faura.	2		1,137.50	3,720		9,220	Paco fire-engine station.
Total city				632,049		112,538	
UNDETERMINED.							
Land on Calzada Bagumbayan, Calles Nozalea, San Marcelino, Concepcion, and San Carlos.	13 pt. 12		191,949.65	345,756		345,756	Insular, Army, city, and church involved in ownership; the Archbishop of Manila pays taxes on part of this land in block 12 to amount of \$16,675 and in block 13 \$48,414.00; total, \$65,089.

EXHIBIT C.—Statement of properties exempt from taxation in the city of Manila, June 30, 1904—Continued.

BY DISTRICT—Continued.

Location.	Lot.	Block.	Superficial area.	Value of land.	Value of improvements.	Total valuation.	Remarks.
<i>Ermila</i> —Continued.							
ROMAN CATHOLIC CHURCH.							
Land and improvements on Calle Marques de Comillas.		10	186.14	\$611	\$1,500	\$2,111	Chapel.
Land and improvements on Calles Real and Nueva.		37	8,906.00	52,975	20,000	72,975	Ermita church and convent.
Total Roman Catholic Church				53,586	21,500	75,086	
ROMAN CATHOLIC ORDERS.							
Land on Calle Padre Faura.	21	47	19,800.53	37,333		37,333	Part grounds Observatory (Jesuits). Observatory (Jesuits). Church and convent (Paulists).
Land and improvements on Calle Padre Faura.	27	47	52,817.76	99,948	100,000	199,948	
Land and improvements on Calle San Marcelino No. 139.	19	60	8,000.00	7,316	30,316	37,632	
Total Roman Catholic orders				144,597	130,316	274,913	
PROTESTANT CHURCH.							
Land on Calle Isaac Peral.	12	24	12,969.28	18,654		18,654	Building under construction. Episcopal Church.
Land and improvement on Calle Nueva.	12	47	1,540.56	5,732	3,000	8,732	
Total Protestant Church				24,386	3,000	27,386	
Total Ermita.						4,227,915	
<i>Malate</i> .							
ARMY.							
Land and improvements on Calles Real, Nueva, Herran, and Cortada.	1	1	12,155.00	44,937	68,600	113,537	Cuartel de Malate.
Land and improvements on Calle Real and Manila Bay.	1	2	16,491.00	85,735	48,400	134,135	Quarters for troops, quartermaster warehouse, etc.
Improvements on rented land.		4			5,550	5,550	Quartermaster distilling plant, stables, bakery, etc.
Land and improvements on Calle Cabañas and Manila Bay.		20	49,666.00	115,523	10,000	125,523	Fort San Antonio Abad.



SAMPALOC HIGH SCHOOL (INTERIOR).

Land on Calle San Antonio Abad.	22	9,580.00	4,790	4,790	National Cemetery.
Total Army			250,985	132,550	383,535
INSULAR.					
Land and improvements on Calle San Andres.	74	30,118.46	10,511	1,200	Bureau of Agriculture, experimental farm.
Do	4	18,184.60	6,642	3,000	Do.
Total insular			17,153	4,200	21,353
CITY.					
Land and improvements on plaza opposite church.	3	271.23	1,580	3,800	The old Tribunal.
Do	4	947.17	5,047	4,500	School.
Land in plaza opposite church	5	1,423.06	6,081		Improvements, car barn owned by street railway company.
Land on Calle San Andres	54	19,785.00	2,968		Fishery.
Land and improvements on Calle Herran	64	10,332.00	9,100	10,000	Herran Market.
Land on Calles Sandedjas and San Andres	78	20,088.00	4,278		Low land, submerged at high tide.
Two pieces of land on Calles San Andres and Vito Cruz.	16	73,360.00	7,336		Vacant lot, low and submerged at high tide.
Land near San Antonio Abad between Calle Cabañas and Estero of San Antonio Abad.	15	30,448.70	27,864		Vacant and low land being filled by city.
Land on Estero of San Antonio Abad and interior Calle Diaz Puertas.	16	23,910.68	2,391		Submerged at high tide.
Land on Calle Real and Estero of San Antonio Abad.	3	7,437.24	3,719		Opposite National Cemetery.
Total city			70,364	18,300	88,664
ROMAN CATHOLIC CHURCH.					
Land and improvements on Calles Real, Remedios Nueva.	8	5,100.00	19,662	75,000	Malate church and convent.
Land and improvements interior Calle Nueva	11	3,025.00	756	1,000	Cemetery.
Land and improvements Calle Singalong	12	2,456.75	1,145	500	School (Madres Paulistas).
Land on Calle San Antonio Abad.	22	11,120.00	5,580		Cemetery.
Total Roman Catholic Church			27,123	76,500	103,623
PROTESTANT CHURCH.					
Land on Calle Cortado	16	5,114.21	757		Episcopal cemetery.
Total Malate					757
					597,982

EXHIBIT C.—Statement of properties exempt from taxation in the city of Manila, June 30, 1904—Continued.
BY DISTRICT—Continued.

Location.	Lot.	Block.	Superficial area.	Value of land.	Value of improvements.	Total valuation.	Remarks.
<i>Paco.</i>							
ARMY.							
Improvement on city land at old powder magazine.		1			\$11,000	\$11,000	3 quartermaster warehouses and dwelling.
INSULAR.							
Land on Calle Union corner Calle San Antonio.	1	13	852.00	\$340		340	Vacant lot.
CITY.							
Grass land near old powder magazine.		1	24,209.93	4,589		4,589	Used by Army.
Land interior Ulliang Cawayan on Estero Paco.		2	2,446.73	4,387		4,387	Improvements, 7 shacks, private owners.
Land on Calle Peñafrancia.	42	3	28,936.57	4,343		4,343	Vacant lot.
Grass land on Calle Peñafrancia.	65	4	18,091.41	3,618		3,618	Do.
Swamp land in center of blocks 6, 7, 11, and 12.		6, 7	2,385.50	716		716	Sink holes.
Land and improvements on Calle Paz.		11, 12	774.08	387	5,263	5,650	Native police station.
Land on Calles Real, Paz, and Agosto.		17	16,463.00	6,905		6,905	Improvements, several nipa shacks, by private owners.
Grass land in barrio Sagat.		31	9,819.51	1,609		1,609	Vacant lot.
Land and improvements on Calle San Marcelino.	2	36	9,519.41	10,899	63,475	74,374	Cemetery.
Total city.				33,493	68,738	102,231	
ROMAN CATHOLIC CHURCH.							
Land and improvements in barrio Peñafrancia.	33	3	398.55	80	2,000	2,080	Chapel.
Land and improvements interior Calle Real.	Part 80	4	10,080.00	2,006	155,224	157,230	Concordia College.
Land and improvement on Calles Loban and Conongo.	7	34	29,206.00	22,730	42,000	64,730	San Vicente College.
Total Roman Catholic Church.				24,816	199,224	224,040	
Total Paco.						337,611	

<i>Pandacan.</i>						
ROMAN CATHOLIC CHURCH.						
Land and improvements on plaza and Calle de Jesus.		3	10,000.00	2,000	15,000	17,000
Land in barrio Beata		3	3,614.22	361		361
Total Roman Catholic Church, Pandacan.				2,361	15,000	17,361
<i>Santa Ana.</i>						
ROMAN CATHOLIC CHURCH.						
Land and improvements on Calles Lamayan and Embaradero.	36	12	8,610.18	2,583	125,000	127,583
Land on Calles Lamayan and Panadero.	37	12	2,847.00	689		689
Total Roman Catholic Church, Santa Ana				3,272	125,000	128,272

Public plazas of Manila, June 30, 1904.

Name and location.	Lot.	Block.	Superficial area.	Value of land.
INTRAMUROS.				
España: Calles Solana, Aduana, and Maestranza -----	2	4	562.27	\$3,370
William McKinley: Calles Palacio, Cabildo, and Santo Tomas -----		10	3,312.01	27,124
Santa Isabela: Calles Anda, Magallanes, and Solana -----		34	1,139.04	8,788
Santa Potenciana: Calles Victoria and Palacio -----	5	52	1,202.80	9,310
Isabel II: Calle San Juan de Letran near gate -----			187.77	1,357
Santo Tomas: Calles Santo Tomas, Magallanes, and Solana -----			987.35	5,416
Total Intramuros -----				55,315
BINONDO.				
Calderon de la Barca: Calles Anloague, Rosario, and Jolo -----		34	4,032.00	137,628
Cervantes: Calles Anloague, Rosario, and G. Galvey -----			370.00	31,140
Total Binondo -----				168,768
ERMITA.				
The Luneta -----		15	56,540.00	452,320
Jardin de Gracia: Calles Real, Marina, and Mercado -----		35,36	1,716.12	17,335
Total Ermita -----				469,655
MALATE.				
Isabel II: Calles Real, Cabañas, and Remedios -----			730.40	3,325
Total valuation of plazas -----				697,063

EXHIBIT D.—Statement of market receipts and expenditures during fiscal year 1904.

RECEIPTS.

[Local currency July to December, inclusive; Philippine currency January to June, inclusive.]

Market.	July.	August.	September.	October.	November.	December.	Total half year ending Dec. 31, 1903.
Divisoria -----	\$12,305.20	\$12,816.50	\$12,157.90	\$12,867.30	\$13,693.50	\$12,870.50	\$76,710.90
Quinta -----	5,200.48	5,814.04	5,189.00	5,801.42	6,455.94	5,668.14	34,129.02
Arranque -----	2,837.72	2,984.45	2,636.26	2,736.04	3,035.80	2,514.23	16,744.50
Herran -----	820.13	845.88	819.91	915.12	1,022.70	830.73	5,254.47
Anda -----	482.60	485.92	507.84	486.73	384.90	308.26	2,656.25
Sampaloc -----	641.45	662.34	613.06	707.31	726.25	697.36	4,047.77
Santa Ana -----	156.77	152.34	147.46	154.34	146.95	146.49	904.35
Tetuan -----	348.39	344.02	535.49	1,078.24	649.25	304.27	3,259.66
Bay -----	582.35	468.70	422.50	755.88	548.31	534.99	3,312.73
Estero -----	490.23	585.49	499.93	693.88	702.82	629.53	3,601.88
Total -----	23,865.32	25,159.68	23,529.35	26,196.26	27,366.42	24,504.50	150,621.53

EXPENDITURES.

Market.	July.	August.	September.	October.	November.	December.	Total half year ending Dec. 31, 1903.
Divisoria -----	\$772.79	\$765.55	\$767.76	\$794.30	\$826.59	\$811.55	\$4,738.54
Quinta -----	380.85	392.25	380.00	391.00	400.53	377.53	2,322.16
Arranque -----	250.20	253.00	245.10	269.00	289.25	278.35	1,584.90
Herran -----	77.58	79.20	77.00	77.25	77.95	76.55	465.53
Anda -----	80.16	88.55	86.25	83.10	83.10	82.00	503.16
Sampaloc -----	45.22	43.70	43.70	44.60	44.60	44.00	265.82
Santa Ana -----	37.26	36.11	36.11	36.11	36.11	36.11	217.81
Tetuan -----	45.22	43.70	44.00	55.50	50.50	43.20	282.12
Bay -----	121.49	116.00	116.00	123.90	118.40	118.40	714.19
Estero -----	45.22	46.10	45.22	47.00	47.10	44.90	275.54
Total -----	1,855.99	1,864.16	1,841.14	1,921.76	1,974.13	1,912.59	11,369.77

EXHIBIT D.—Statement of market receipts, etc.—Continued.

RECEIPTS.

Market.	January.	February.	March.	April.	May.	June.	Total half year ending June 30, 1904.
Divisoria	P13,060.60	P13,616.70	P13,289.00	P12,540.40	P14,194.88	P12,933.40	P79,634.98
Quinta	5,843.93	6,420.90	6,215.38	5,961.05	6,770.66	5,886.73	37,098.65
Arranque	2,540.46	3,025.04	3,014.59	2,839.78	3,165.24	2,814.83	17,399.94
Herran	810.62	906.88	887.35	950.76	1,009.16	912.25	5,477.02
Anda	245.23	230.67	215.62	261.45	289.50	301.30	1,543.77
Sampaloc	598.41	634.87	650.84	712.45	726.49	672.16	3,995.22
Santa Ana	147.72	135.85	141.75	136.60	139.09	129.46	830.47
Tetuan	386.69	477.92	374.24	253.74	264.96	158.99	1,916.54
Bay	681.65	598.48	552.60	466.09	538.99	673.13	3,611.54
Estero	860.92	761.41	818.00	730.12	692.10	627.35	4,489.90
Total	25,176.23	26,808.72	26,159.37	24,853.04	27,791.07	25,109.60	155,898.03

EXPENDITURES.

Divisoria	P758.50	P729.90	P771.44	P739.00	P744.12	P786.02	P4,526.98
Quinta	335.40	330.64	345.60	344.34	345.12	344.96	2,046.06
Arranque	243.00	241.80	234.60	227.20	232.52	231.00	1,410.12
Herran	69.00	68.00	65.00	64.12	66.72	64.00	397.44
Anda	70.00	80.00	60.00	58.00	59.48	68.54	396.02
Sampaloc	40.00	39.00	38.00	37.60	37.48	36.20	228.28
Santa Ana	31.50	31.00	30.00	30.00	31.00	28.00	181.50
Tetuan	35.00	34.00	32.00	30.00	30.00	29.00	190.00
Bay	106.00	128.00	120.00	118.00	120.20	130.00	722.20
Estero	40.00	44.00	44.00	43.00	43.60	42.40	257.00
Total	1,728.40	1,724.34	1,740.64	1,691.86	1,710.24	1,760.12	10,355.60

Percentage of expenditures to collections.

Market.	Half year ending December 31, 1903.	Half year ending June 30, 1904.
Divisoria	6.8%	5.6%
Quinta	6.4%	5.4%
Arranque	9.4%	8.1%
Herran	8.4%	7.4%
Anda	18.4%	25.4%
Sampaloc	6.4%	5.9%
Santa Ana	24.5%	21.1%
Tetuan	8.4%	9.6%
Bay	21.4%	20.4%
Estero	7.4%	17.4%
Average	7.4%	6.4%

Net collections.

Month.	Local currency.	Month.	Philippine currency.
July	\$22,009.33	January	P23,447.83
August	23,295.52	February	25,084.38
September	21,688.21	March	24,418.73
October	24,274.50	April	23,161.18
November	25,392.29	May	26,080.83
December	22,591.91	June	23,349.48
Total	139,251.76		145,542.43

Percentage of expenses to collections, July to December 92.8%

Percentage of expenses to collections, January to June 93.7%

EXHIBIT E.—*Annual statement of receipts and disbursements during fiscal year 1904.*

[Showing collections in local currency reduced to Philippine currency at rate at which collected and consolidated with collections in Philippine currency.]

RECEIPTS.

Source of revenue.	First quarter.			
	July.	August.	September.	Total quarter.
Land tax.....	P1,885.50	P5,318.09	P9,539.95	P16,743.54
Industrial tax.....	90,976.96	7,590.12	4,814.44	103,381.52
Stamp sales.....	11,210.74	12,208.37	11,109.03	34,528.14
Certificates of registration.....	14,811.28	2,821.73	2,616.50	20,249.51
Matadero tax.....	13,434.28	15,077.87	15,009.11	43,521.26
Market tax.....	19,747.80	21,877.97	20,460.29	62,086.06
Licenses.....	32,999.96	13,527.66	29,447.68	75,975.30
Live-stock registration.....	121.76	115.39	80.52	317.67
Vehicle tax.....	10,002.08	2,223.74	798.48	13,024.30
Vehicle equipment.....	409.82	316.60	180.10	906.52
Municipal Court fines.....	10,167.36	15,120.14	14,956.12	40,243.62
Justice of peace fees.....	394.48	327.68	331.66	1,053.82
Sheriff's fees.....	931.12	832.24	890.66	2,654.02
Rents.....	1,221.56	1,314.50	1,206.70	3,742.76
Miscellaneous.....	20.40	19.13	1,165.78	1,205.31
Certificates of installation.....	276.50	369.00	254.00	899.50
Pound receipts.....	771.44	280.30		1,051.74
Registration of cocheros.....	249.42	127.43		376.85
Public-health fees.....	1,237.04	1,092.13	1,370.00	3,699.17
Total.....	210,869.50	100,560.09	114,231.02	425,660.61

Source of revenue.	Second quarter.			
	October.	November.	December.	Total quarter.
Land tax.....	P50,308.85	P51,035.40	P480,517.56	P581,861.81
Industrial tax.....	87,570.50	5,147.70	5,426.12	98,144.32
Stamp sales.....	13,407.76	12,601.65	13,648.53	39,657.94
Certificates of registration.....	4,212.22	2,340.07	1,516.53	8,068.82
Matadero tax.....	14,449.73	12,941.16	14,999.65	42,390.54
Market tax.....	22,192.44	22,068.20	23,623.95	67,884.59
Licenses.....	21,642.14	14,404.46	38,474.77	74,521.37
Live-stock registration.....	114.00	86.78	56.52	257.30
Vehicle tax.....	9,733.92	878.91	432.39	11,045.22
Vehicle equipment.....	277.30	173.70	110.38	561.38
Municipal Court fines.....	15,831.37	9,556.46	10,475.55	35,863.38
Justice of peace fees.....	421.82	456.07	348.39	1,226.28
Sheriff's fees.....	797.15	935.74	1,714.98	3,447.87
Rents.....	1,328.70	1,269.61	1,185.11	3,783.42
Miscellaneous.....	20.00	488.92	48.70	557.52
Certificates of installation.....	367.50	366.50	264.50	998.60
Pound receipts.....	512.48	384.41	287.17	1,184.06
Public-health fees.....	1,998.61	1,496.39	1,309.28	4,804.28
Fees Secretary Municipal Board.....		16.50	4.00	20.50
Fees City Attorney.....			7.50	7.50
Total.....	245,186.49	136,648.63	594,451.58	976,286.70

Source of revenue.	Third quarter.			
	January.	February.	March.	Total quarter.
Land tax.....	P408,037.64	P9,549.92	P33,769.13	P451,356.69
Industrial tax.....	130,742.91	12,323.52	28,859.43	171,925.86
Stamp sales.....	11,646.97	16,332.31	19,078.34	47,057.62
Certificates of registration.....	1,102.00	765.00	737.00	2,604.00
Matadero tax.....	15,936.16	15,627.53	14,540.87	46,104.56
Market tax.....	24,118.52	27,872.85	26,159.45	78,150.82
Licenses.....	62,905.04	20,754.23	38,466.98	122,126.25
Live-stock registration.....	117.80	74.40	86.30	278.00
Vehicle tax.....	11,759.49	1,463.25	1,168.26	14,391.00
Vehicle equipment.....	185.52	210.00	134.50	530.02
Municipal Court fines.....	12,240.73	12,585.34	15,649.96	40,476.03
Justice of peace fees.....	403.41	390.02	415.04	1,208.47
Sheriff's fees.....		813.19	936.26	1,749.45
Rents.....	1,672.62	1,870.29	1,270.75	4,813.66
Miscellaneous.....	991.58	1,120.83	13.63	2,126.04
Certificates of installation.....		693.50	146.00	839.50

EXHIBIT E.—Annual statement of receipts and disbursements, etc.—Continued.

Source of revenue.	Third quarter.			
	January.	February.	March.	Total quarter.
Pound receipts	₱51.87	₱586.25	₱428.80	₱1,066.92
Public-health fees	1,054.81	1,005.48	1,501.28	3,561.57
Fees Secretary Municipal Board	9.00			9.00
Fees City Attorney	6.40			6.40
Sales of city land		4,064.00	949.39	5,013.39
Total	682,981.97	127,601.91	184,311.37	994,895.25

Source of revenue.	Fourth quarter.			
	April.	May.	June.	Total quarter.
Land tax	₱21,628.21	₱56,237.40	₱585,387.33	₱663,252.94
Industrial tax	213,867.52	16,875.45	5,285.08	236,028.05
Stamp sales	15,616.87	13,300.18	15,907.20	44,824.25
Certificates of registration	18,796.01	21,743.02	19,965.01	60,504.04
Matadero tax	14,849.91	14,615.39	14,163.68	43,628.98
Market tax	24,853.13	27,791.16	25,109.71	77,754.00
Licenses	26,626.46	10,266.81	41,850.70	84,743.97
Live-stock registration	112.50	71.00	72.30	255.80
Vehicle tax	10,750.09	1,676.50	662.00	13,088.59
Vehicle equipment	207.81	164.90	156.20	528.91
Municipal Court fines	11,112.08	12,404.07	11,872.13	35,388.28
Justice of peace fees	388.12	454.90	494.01	1,337.03
Sheriff's fees	879.77	1,912.97	845.91	3,638.65
Rents	1,429.28	1,354.64	1,193.61	3,977.53
Miscellaneous	839.27		575.51	1,414.78
Certificates of installation	368.00	332.00	518.00	1,218.00
Pound receipts	12.07	619.50	423.45	1,055.02
Public-health fees	1,352.92	957.19	1,244.54	3,554.65
Fees Secretary Municipal Board		9.00	29.00	38.00
Fees City Attorney			20.32	20.32
Sales of city lands	59.00	388.00		447.00
Weights and measures			185.24	185.24
Pail system			1,790.04	1,790.04
Building permits			1,311.59	1,311.59
Cleaning vaults			159.29	159.29
Boiler inspection			456.00	456.00
Total	363,749.02	187,174.08	729,677.85	1,280,600.95

Source of revenue.	Total fiscal year—		Estimated receipts, fiscal year 1905.
	1904.	1903.	
Land tax	₱1,713,214.98	₱1,168,292.84	₱1,000,000.00
Industrial tax	609,479.75	461,658.04	265,000.00
Stamp sales	166,067.95	133,164.78	85,000.00
Certificates of registration	91,426.37	104,177.58	90,000.00
Matadero tax	175,645.34	140,491.28	175,000.00
Market tax	285,875.47	218,048.94	300,000.00
Licenses	357,366.89	329,640.90	350,000.00
Live-stock registration	1,108.77	1,013.42	1,000.00
Vehicle tax	51,549.11	41,905.62	55,000.00
Vehicle equipment	2,526.83	2,634.40	2,000.00
Municipal Court fines	151,971.31	125,383.74	160,000.00
Justice of peace fees	4,825.60	3,798.78	5,000.00
Sheriff's fees	11,489.99	7,133.78	10,000.00
Rents	15,817.37	9,018.36	16,000.00
Miscellaneous	5,303.65	4,632.78	5,000.00
Certificates of installation	3,955.60	3,347.62	4,000.00
Pound receipts	4,357.74	1,883.32	4,000.00
Registration of cocheros	376.85	2,238.30	
Public-health fees	15,619.67	8,130.66	15,000.00
Fees Secretary Municipal Board	67.50		100.00
Fees City Attorney	34.22	219.08	200.00
Sales of city land	5,460.39		5,000.00
Weights and measures	185.24		2,500.00
Pail system	1,790.04		20,000.00
Building permits	1,311.59		20,000.00
Cleaning vaults	159.29		3,000.00
Water rents			300,000.00
Boiler inspection	456.00		6,000.00
Total	3,677,443.51	2,766,814.22	2,898,800.00

EXHIBIT E.—Annual statement of receipts and disbursements, etc.—Continued.

DISBURSEMENTS.

Disposition of funds received.	First quarter.			
	July.	August.	September.	Total quarter.
Regular supplies, Insular Purchasing Agent	P872.90	P768.86	P146.30	P1,788.06
Incidental expenses	72.79	73.30	49.69	195.78
Printing and binding	613.70	1,453.50	197.30	2,264.50
Transportation	134.10	106.20	102.00	342.30
Tax refunds	2,902.63	557.59	1.29	3,461.51
Salary and wages	12,005.02	12,476.36	12,831.84	37,313.22
Total	16,601.14	15,435.81	13,328.42	45,365.37

Disposition of funds received.	Second quarter.			
	October.	November.	December.	Total quarter.
Regular supplies, Insular Purchasing Agent	P564.73	P583.22	P456.35	P1,604.30
Incidental expenses	252.26	218.28	109.64	580.18
Printing and binding	665.40	458.20	974.50	2,098.10
Transportation	118.35	90.87	62.40	271.62
Tax refunds		20.94	409.95	430.89
Salary and wages	12,436.33	11,928.34	11,716.96	36,081.63
Total	14,037.07	13,299.85	13,729.80	41,066.72

Disposition of funds received.	Third quarter.			
	January.	February.	March.	Total quarter.
Regular supplies, Insular Purchasing Agent	P439.50	P254.86	P311.16	P1,005.42
Incidental expenses	93.00	86.60	31.00	210.60
Printing and binding	286.90	202.50	623.30	1,112.70
Transportation	104.00	117.40	111.50	332.90
Tax refunds	37.88	84.17	198.82	320.87
Salary and wages	12,937.26	12,627.86	11,754.18	37,319.30
Total	13,898.54	13,373.39	13,029.86	40,301.79

Disposition of funds received.	Fourth quarter.			
	April.	May.	June.	Total quarter.
Regular supplies, Insular Purchasing Agent	P498.43	P238.96	P360.69	P1,098.08
Incidental expenses	42.70	99.30	38.90	180.90
Printing and binding	1,265.90	1,200.60	216.00	2,682.50
Transportation	123.00	128.85	91.60	343.45
Tax refunds	41.66	175.99	91.88	309.53
Salary and wages	11,987.86	12,267.44	12,710.54	36,965.84
Total	13,959.55	14,111.14	13,509.61	41,580.30

Disposition of funds received.	Total fiscal year—		Estimated disbursements fiscal year 1905.
	1904.	1903.	
Regular supplies, Insular Purchasing Agent	P5,495.86	P6,842.39	P5,984.80
Incidental expenses	1,167.46	944.88	720.00
Printing and binding	8,157.80	11,871.87	8,656.00
Transportation	1,290.27	854.94	1,668.00
Tax refunds	4,522.80	1,433.94	3,000.00
Salary and wages	147,679.99	142,540.96	166,080.00
Total	168,314.18	164,488.98	186,108.80

I certify that the above abstract is correct.

C. B. WELTNER,
Cashier Department of Assessments and Collections.

REPORT OF THE SUPERINTENDENT OF CITY SCHOOLS.

MANILA, P. I., *October 1, 1904.*

SIRS: I have the honor to submit the following report of the public schools of the city of Manila for the year ending June 30, 1904:

Results accomplished during the year justify the belief that public education in the city is at present upon a substantial and, barring accidents, an enduring basis. All classes of natives seem to possess a reasonable interest in the work. Spaniards at worst show a friendly indifference, and in many cases take an active interest in the modern scheme presented. Old caste distinctions have died off, or at least have been removed to such an extent that their effect is no longer noticeable. The rich, the middle class, and the poor are all well represented and seem satisfied to meet, in the school room at least, upon terms of equality. The school is rapidly assuming its proper place as the center of youthful activity in the community. Attendance is becoming more regular. Pupils no longer drop in for occasional instruction or amusement, but seem to have accepted the idea of definite connection with particular classes as the proper one.

Abnormal conditions, formerly noticeable and embarrassing, are rapidly passing out of existence. Attendance in elementary schools is no longer confined to small children. Boys well grown are no longer ashamed to be associated with children's classes. District boundaries are becoming better defined. The disposition to roam from school to school is being checked and brought under proper control. It is true that the present system of school districting is far from complete, due to shifting of population, but the improvement effected during the year indicates a reasonably early settlement of the difficulty.

Native parents seem much better disposed than formerly. Interest is no longer confined to mere toleration. The boy and girl who a year ago were allowed to attend are now sent to school. Upon every hand are encountered evidences of little sacrifices made by parents in the interest of the education of their children. The relations existing between church and private educational institutions and city schools seem to be all that could reasonably be desired. A fairly large percentage of the city night-school attendance is composed of students of these institutions. They are evidently anxious to acquire English and recognize the merit of the city night-school course.

SCHOOLS.

CLASSIFICATION.

The classification of city schools is the same as last year—elementary schools, secondary schools, night schools, normal school, and kindergarten. The proportion is practically the same with the exception that there are now 7 instead of 4 kindergartens as formerly; that there are 31 instead of 23 night schools, and that the two former normals have been combined and are now operated as one.

ATTENDANCE.

The unsatisfactory enrollment and attendance condition indicated in former reports has been considerably improved. The following table indicates actual conditions:

Month.	Day schools.			Night schools.		
	Enroll- ment.	Attend- ance.	Percent- age.	Enroll- ment.	Attend- ance.	Percent- age.
June, 1902 -----	2,244	1,992	84	1,556	1,254	87
June, 1903 -----	3,046	2,341	92	2,626	2,107	87
June, 1904 -----	5,767	4,602	92	5,043	4,074	83

There is every indication that this considerable increase in attendance is substantial and, facilities permitting, will continue. No attempt has been made to swell enrollment beyond the working capacity of the present equipment. The actual effort has been in the direction of such a monthly addition to the student body as could be absorbed without serious disturbance of existing conditions. That this effort has been successful is indicated by the fact that since June, 1903, the average percentage of attendance in the entire city day schools has been 92. In only one of the months included has the average fallen as low as 90, and in one month it reached 95 per cent. Attendance is exceedingly uniform. It is rarely that the monthly percentage in a particular school falls below 90. Attendance is rapidly assuming a more normal aspect than formerly. Abnormal conditions are being removed. Pupils are beginning to enter school at proper age, from 6 to 8. There is every reason to believe that they will continue in attendance until well grown. Pupils well advanced in age and general ability, but who have had no training in English, constitute a class which has seriously interfered with proper grading of elementary schools. The advancement of these pupils is naturally much more rapid than that of those younger. For a time it appeared that they would interfere in this way indefinitely. The danger has, however, passed. With two secondary schools containing a total of more than 600 pupils, all over 14; with evening schools containing 5,858 pupils, all over 14; and with the great mass of these

older pupils already in the elementary schools, it is certain that in less than two years these grown pupils will have been generally disposed of and matriculants will be of proper age.

A decided improvement in the disposition of pupils is apparent. They seem to be in no hurry to get through school. An extensive canvass of the city schools shows that of the pupils in actual attendance in 1901 a reasonably large percentage is still present. The percentage of the matriculants of 1902 and 1903 still in attendance is larger out of all proportions. Even in the night schools, where attendance is supposed to be transient, whole classes of adults are spending the fourth year in study. The spirit of investigation and experimentation, formerly strong in evidence, seems to have been satisfied and is no longer apparent.

The above is important as indicating that city natives have come to consider school as a continuing necessity and education as a reasonably protracted process. The earlier anticipated danger was that they would demand immediate results and insist upon the school serving as an educational quick-meal institution which would do impossible things upon the short-order plan. The actual tendency of all evidence at hand is to show that the city pupil entering school at from 6 to 8 years of age may safely be counted upon to remain in the elementary course for 7 or 8 years. The evidence is not conclusive as to the percentage of these pupils who, after completing this course, will enter high school, but it may be safely assumed that it will be large.

The proper place of higher education is rapidly being established. The unfortunate tendency to rush through elementary courses for the purpose of taking up higher work, formerly a fad among certain classes of Filipinos, and which was unfortunately countenanced by some American educators, has been checked. Americans and Filipinos alike are coming to realize that the most important function of the school is to furnish extensive and thorough elementary instruction to a people whose greatest intellectual weaknesses are indefiniteness of thought and inaccuracy of process and expression. The careful, laborious, and systematic drill which Filipinos have never received and through which any race, to be practical, must pass constitutes the most important function which educators in the Philippines have to perform.

EQUIPMENT.

As was indicated in the last report the equipment of the city schools is far from complete.

BUILDINGS.

In no section of the city except Intramuros are school buildings sufficient for present demands. The proper capacity of these buildings was passed last year. In spite of this fact 3,131 new pupils have been added

to the enrollment since that time. The result has been that the sanitary benefit resulting from repairing and cleaning during the vacation period has been more than neutralized by the additional crowding of class rooms. The class of buildings occupied by schools has been improved since the date of last report. New buildings have been secured for the following schools:

Intramuros Boys and Girls', No. 172 Victoria, Intramuros; Santa Cruz Boys', 608 Bilibid; Quiapo Boys', 63 Noria; Paco Girls', 365 Real; Tondo Secondary, 569 Lemery; Kindergarten, 110 Dulumbayan; Kindergarten, 87 Padre Rada, Tondo.

The rent rate of school buildings remains unreasonably high. Property owners seem disposed to make even a greater distinction between values of buildings used for public and those used for private purposes than in other parts of the world. One hundred and fifty dollars, gold, is not an unusually high monthly rental for a building with from 6 to 10 rooms.

Another unfortunate feature of the situation is the fact that proper buildings do not exist in portions of the city in which largest attendance is possible. In spite of the effort of this office and the generosity of the Municipal Board it has been found impossible to accommodate the school population in these districts. The only plausible solution of the difficulty is the construction of proper school buildings by the city where needed. In this way facilities can be distributed as required, and the people of highly congested districts who are housed in nipa and bamboo will no longer be denied the privilege of an education as at present.

FURNITURE.

The lack of proper furniture in the city schools is becoming very apparent. So rapid has been the increase in attendance that the rather liberal provisions already made have proven entirely inadequate. The department of city schools now possesses reasonably comfortable seating accommodations for six thousand pupils approximately. With these facilities 7,403 pupils are crowded together, with every prospect of a steady addition of 500 new pupils per month. In a few schools, situated in small districts, the jamming process has not yet been found necessary. In others it has been carried on to such an extent that all rules of comfort and most of those of hygiene have been violated. It is believed that locally constructed furniture is better adapted to present needs than the variety which has heretofore been imported from the United States. The local article is much cheaper, breakage is not nearly so great, and greater economy of space is possible. The present outfit of American patent adjustable desks described in terms of comfort, convenience, economy, and adaptability have proven a failure.

ic.—The department of music has accomplished results far beyond
 on. The force consists of an American director and three
 supervisors. Every pupil in the city schools receives not
 fifteen numbers musical instruction daily. This department
 has clearly passed the experimental period and has become established
 as a substantial necessity.

Statement of expenses during fiscal year 1904.

Salaries and wages:

Office force	P5,259.86
Night-school teachers	123,805.00
Filipino teachers	144,887.29

Total	273,952.15
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Contingent expenses:

Transportation, labor, and office supplies	5,477.66
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SUMMARY.

Salaries and Wages	273,952.15
Contingent expenses	5,477.66

Grand total	279,429.81
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Respectfully submitted.

G. A. O'REILLY,
Superintendent of City Schools.

The MUNICIPAL BOARD,
Manila, P. I.

24305—21

